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Determinants of School Attendance in Rural Ethiopia

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1. Introduction:

The primary school enrollment rates of Sub-Saharan African countries are still among the lowest worldwide. In 2009, only 51% of African children completed primary school (World Bank 2009). In the case of Ethiopia however, the country's education system has undergone substantial reforms in the last 18 years: The government formulated and adopted a new education policy in 1994 that led to far-reaching investments in public schools at the primary and secondary levels (Chaudhury et al. 2006: 4-5). As a result, the net enrollment rate[1] for primary schooling rose from 30% in 1991 to 81% in 2010 (World Bank 2012: 86). In rural areas, enrollment of primary school children rose from 15% in 1995 to 38.8% in 2005 (Mani et al. 2009: 3). Still, school attendance in Ethiopia remains among the lowest worldwide and in particular only few rural children attend school. Also, about half of the children enrolled drop out before having completed primary school (cf. Weir 2010: 91).

Why is a high school enrollment ratio important for the well-being of people? The reasons are manifold: First, there appears to be a strong link between schooling or human capital accumulation respectively and income and economic growth: The effect of schooling on private income has been the topic of interest of many studies, one of the best-known probably being the one by Angrist and Krueger (1991) who find that students who are compelled to attend school for an extra year receive higher wages as a result.[2] In developing countries specifically, private returns to schooling lie between 5 and 15% according to Orazem and King (2008).[3] A large amount of empirical research on the relationship between education and growth has been produced following the seminal piece of work by Mankiw, Romer and Weil (1992), who tested the Solow growth model augmented for human capital and found it to hold. Among the more recent studies are the one by Cohen and Soto (2007) who use the OECD database on educational attainment and surveys published by UNESCO and find significant coefficients for schooling in cross-country growth regressions and panel data estimates for 95 countries. Ciccone and Papaioannou (2009) find that countries with higher initial education levels experienced significantly faster value-added and employment growth in schooling-intensive industries in the 1980s and 1990s, especially when open to international trade. Breton (2010) investigates potential external benefits of schooling on national income. Using a dataset for 61 countries (including Ethiopia) he concludes that the national rate of return on investment in schooling is much larger than the private return in

[1] The Net Enrollment Rate is defined as the ratio between the students who are within the official age range for

[2] The authors exploit the fact that in the U.S. people born earlier in the year start school at a later age and are thus allowed to leave school after having completed less schooling than people born earlier. Therefore, quarter of birth can be used as an instrument for education.

[3] For an extensive review on studies about the relationship between income and child schooling with a strong focus on developing countries see also Behrman and Knowles (1997).

low-income countries while being roughly the same as the private return in high-income countries. Schooling can thus be regarded as a public good in low-income countries. However, the growth effect of education has not remained undisputed even early on: In their influential piece of work, Benhabib and Spiegel (1994) find that human capital is insignificant in the growth accounting regressions pertaining to a Cobb-Douglas aggregate production function. Yet, they find the level of a country's human capital stock to exert an influence which they explain with a higher education level positively affecting innovation and adoption of technology. Barro and Sala-i-Martin (1995) also find no significant effect of a change in education on GDP growth.[4]

Looking at Ethiopia specifically, the World Bank Country Study "Education in Ethiopia" (World Bank 2005) finds a significant impact of a minimum of four years of primary schooling on agricultural productivity and attributes this to the adoption of new technologies and inputs by better-educated farmers. Weir and Knight (2000) further show that additional schooling increases the probability of fertilizer use. In another paper (2007) they find substantial externality effects of education in agriculture through the adoption and diffusion of innovations. However, education not only increases the productivity of farmers, but also the earnings of salaried workers (World Bank 2005: 188). For Ethiopia as a whole the World Bank Country Study finds private returns to education to be highest at the lowest as well as at the highest levels of education (World Bank 2005: 189). Furthermore, education was found to lower the overall poverty rate (World Bank 2005: 191-192)

Education is however not only thought to have a positive impact on income or economic growth, but is believed to exert a widespread positive influence on health (see for instance Buckles at al. 2012 for the US). In Ethiopia specifically, education was found to be positively related to children's height-for-age score and inversely related to the mortality rate of children under five years old (World Bank 2005: 193). Furthermore, education is generally assumed to have an effect on family planning and fertility. Education seems to have a declining impact on fertility in developed countries (see Cygan-Rehm and Mäder 2012 for Germany and Aldieri and Vinci 2012 for Italy) as well as in emerging market and developing countries (see Breierova and Duflo 2002 for Indonesia for example). For Ethiopia, the education of women was found to be inversely related to fertility (World Bank 2005: 192), a result that is in line with Portner et al. (2011) who found access to family planning programs to reduce fertility

[4] For a more detailed discussion of the non-existence of effects of education see the survey by Krueger and Lindahl (2001). The authors argue that the absence of effects of education may be caused by measurement error and also discuss the fact that the effect is usually larger in macroeconomic growth regressions than in microeconometric studies which they attribute to reverse causality and omitted variables but also external effects of education.

only for women without formal schooling and thus concluded that family planning programs and formal education might act as substitutes in a low-income, low-growth setting.

Besides, education is sometimes found to have a positive impact on mental health (see Chevalier and Feinstein 2007 for the UK) and to be associated with subjective well-being and quality of life (see Helliwell 2003 for 46 different countries). Also, education is apparently correlated with the political system of a country at large: Barro (1999) found that the propensity for democracy was rising with primary schooling among other factors.

In summary, it can be stated that the existing body of research – in particular regarding Ethiopia – clearly suggests the benefits of a rise in school enrollment. Therefore, the purpose of this study is to add to the existing findings on the reasons for school attendance using the newest data at hand.

The data are taken from the 2009 wave of the Ethiopian Rural Household Survey (ERHS). The ERHS is a socioeconomic survey conducted in different rural peasant associations of Ethiopia from 1989 to 2009. The 2009 wave includes 1576 households in 18 peasant associations[5] (villages) in 18 *Woredas* (districts) in 4 regions.

In this study, I examine what determines school attendance of primary school age children (7-15 years old) in the peasant associations covered by the ERHS. At the individual level, potential determinants are age, gender, the highest educational level already achieved and of course if and to what extent children engage in work activities. At the household level potential determinants are for example the income of the household and the educational levels of parents and age and gender of the head of the household. Particular emphasis will however also be put on factors that increase the household's wealth on the one hand but make child labor more productive and thus potentially reduce enrollment on the other hand. These factors include assets such as land, animals and tools but also the composition of the household. Furthermore, time and risk preferences of the household head are included as potential determinants at the household level.

I employ a Linear Probability Model (with and without household fixed effects) and a Probit model to account for factors at the individual level and a Probit model to investigate determinants at the household level.

At the individual level age decreases the likelihood of school enrollment, while success in school seems to have some positive influence. As expected, time used for farming and housework has a negative effect, while time allocated to studying raises enrollment.

[5] A peasant association is the smallest administrative unit in Ethiopia. It can be equivalent to a village or a cluster of villages (Dercon and Hoddinott 2011, p. 2 footnote)

At the household level income (measured by food consumption) has a highly significant positive effect on schooling. Land held on the contrary has a negative effect, most likely due to the fact that it increases the productivity of labor of household members. Other assets do not have the same effect though. Interestingly, no effect can be established for the number of young children and elderly living in the household. Age and gender of the household head and education of mothers do not seem to exert an influence either, while the education of fathers does seem to have an effect but has to be interpreted with caution due to a lack of variation in education levels of fathers.

Time preferences of respondents shall be revealed by the use of hypothetical questions, while risk preferences are proxied by the results of a small experimental game and an additional hypothetical question. Neither of them seems to be related to school attendance however.

2. Empirical Background

Several Studies on the determinants of school attendance among Ethiopian children and young adults have been undertaken:

Admassie and Bedi (2003) use the fifth round of the Ethiopian Rural Household Survey that was conducted in 1999 and 2000 in 18 peasant associations. The authors restrict their sample to children between 4 and 15 years of age for whom they have complete information which leaves them with 3043 observations. They put a particular focus on the availability of modern agricultural technology and its link to child work and school attendance and look at the total number of hours worked by a child within a week instead of using a discrete indicator for work.

Since most children who work do so in the household which they are a part of, Admassie and Bedi assume an incomplete market for child labor with no market-determined wage rate. They use a two-stage maximum likelihood (2CML) procedure and first estimate the hours of work using OLS. Hours of work are regarded as a choice variable depending on the household's valuation of child time (the shadow wage), the price of schooling, the price of inputs used in productive activities of the household and exogenous child, household and demographic characteristics as well as other exogenous variables such as land quantity, land fertility or climate. The shadow wage is in fact a function of gender, age, ethnicity and religion of the child and the demographic composition of the household. The second step is then to estimate school attendance. Independent variables for school attendance are the shadow wage, the price of schooling, exogenous child, household and demographic characteristics and the hours worked by the child. A Probit model is used.

Admassie and Bedi detect a non-linear relationship between the hours that children work and their school attendance and reading and writing abilities. Initially there is a positive relationship, i.e. the more a child works the more likely it is also to go to school but at a workload of 22 hours per week school attendance starts to suffer. Reading and writing abilities are also initially positively related to working, but the relationship becomes negative already at a value of 16 hours of work per week. The endogeneity correction term is insignificant, thus suggesting that schooling and hours of work are not simultaneously determined.

Analysis with a set of five disaggregated hours of work variables for the different work activities of child care, domestic work, herding, fetching water and wood and farm work is precluded by data requirements and thus the authors use non-parametric smoothing methods to show the bivariate relationships with schooling. Herding, farm work and child

care seem to be incompatible with school attendance while domestic work and fetching wood and water do not seem to have an effect.

Chaudhury, Christiaensen and Asadullah (2006) examine among other factors the role of adverse income shocks on school enrollment and completion. They use data from the Welfare Monitoring Survey (WMS), a household survey conducted by Ethiopia's Central Statistical Authority (CSA), for the years 1996 and 2000 and School Census data from the Education Management Information System (EMIA) for 1996 and 1999. They restrict their focus to children between the ages of 7 and 14 years and operate with a final working sample size of 17475 children. Their study investigates the probability of primary school enrollment and completion using a reduced-form demand equation and Probit specification. The authors argue that relations to the supply of schooling (its quantity as well as its quality) do not have to be taken into account since the allocation of schools, teachers and funding is not based on enrollment or income in Ethiopia but population norms. Fixed effects are controlled for with the inclusion of mother dummies for example, while age dummies for each year are also used.

Controlling for various supply and demand side factors such as school quality, distance to the school, parental education, gender of household head and household expenditures the authors find that girls receive significantly less schooling than boys and argue that this could be a consequence of differential returns of education and/or cultural factors. This finding leads them to examine the determinants of enrollment and completion for girls and boys separately. They find that the probability of school enrollment is positively influenced by a higher education level of adults in the household (especially for girls) but also the education level of the community as a whole (especially for boys). The authors attribute this to either reflect the shaping of individual (or household) demand for education by the community or to the education level of the community acting as a proxy for community wealth. Household income has only a modest influence, which becomes slightly stronger however in rural areas and for boys. Production shocks affect enrollment in rural areas, and in particular the enrollment of girls. Households seem to protect schooling investment in their sons rather than in their daughters. As suspected, distance to the school lowers enrollment and teacher-student ratio supports it. The proportion of female teachers also positively affects enrollment rates.

Cockburn and Dostie (2007) consider the effect of income changes on child schooling and work. Though schooling and leisure are usually assumed to be normal consumer goods and income is thus generally believed to decrease child work and increase school attendance among children, empirical evidence proving this relationship is in fact weak. The authors argue that the reason for this could be that income works as a proxy for asset variables and

greater access to assets could raise the demand for labor. As functioning labor markets are absent in rural Ethiopia this would then lead to a rise in child labor and reduced school attendance.

Cockburn and Dostie use three rounds of surveys from the Ethiopian Rural Household Survey, the data of which were collected in 1994 and 1995 and cover 1477 households in 15 villages. The authors use a multinomial Logit model and restrict their analysis to children between the ages of 6 and 15. Children or their families, respectively, decide between work, schooling and leisure as their main activities and children's utility depends on household income and on variables influencing their work productivity such as ownership of various assets and the composition of the household. Because participation rates and the sort of work they are engaged in are different for boys and girls, they are studied separately. Children of the same family share an unobserved household component. Cockburn and Dostie also estimate a mixed multinomial Logit model where error terms can be correlated at the household level and a simultaneous model where household income is estimated simultaneously with children's decisions in order to avoid endogeneity problems. Village dummies are added to include for village heterogeneity.

The results are generally in line with the authors' expectations regarding which assets should enhance children's productivity and thus lower schooling rates and which should not have an influence or even be a substitute for child work: A close source of water increases the probability of boys' schooling. Ownership of small animals lowers school attendance although the result is not significant. Land ownership also has a negative impact on schooling but the results are not significant either. Ownership of ploughs and sickles (assets usually only used by adults) has a highly significant positive effect on boys' schooling as does ownership of bulls and oxen. The number of elderly persons in the household lowers the likelihood of schooling for girls but raises the one for boys. Boys' school attendance also rises with the number of younger boys and older girls in the household, girls' attendance increases with both the number of older and younger children. As one would assume, income has a positive influence on schooling which is however significant only for girls. Furthermore, a female household head increases the likelihood for schooling, as do the education of the household head and being a biological child of the household head. The last effect is particularly strong for boys.

Mani, Hoddinott and Strauss (2009) investigate the determinants of enrollment and relative grade attainment among primary school children between 7 and 14 years old in rural Ethiopia. They use the 1994, 1999 and 2004 waves of the Ethiopian Rural Household Survey. The authors do not include observations on high school age children in order to avoid selection bias that would result from the widespread migration among high school age

females. Household migration however is not a concern because household attrition rates in the survey are low. Concerning the socioeconomic characteristics of households information for the year in which schooling investments decisions have been made are used.

The authors estimate a conditional schooling demand function. Among the independent variables are age (dummy variables for each year), gender, mother's age and parental schooling at the individual level, the number of adult females and males, the age of the head and consumption expenditure at the household level and distance to the school and availability of electricity and piped water at the village level. Household fixed-effects are not used because there are not enough instances of multiple children in the relevant age group in the same household. Instrumental variables (land, livestock and an interaction term between land and rainfall) are used to address endogeneity regarding household income.

The authors find that enrollment is positively correlated with parental schooling and the consumption proxy for household income. Community characteristics do not exert an influence. Provision of electricity and proximity of the school however increase the enrollment rate.

Senbet (2010) considers the determinants of the allocation of children's time towards school attendance, work or leisure. He uses data from the Demographic and Health Survey collected by the Central Statistical Authority (CSA) in 2000 and 2001 and focuses on school attendance of girls and boys between the ages of 6 – 15 in rural Ethiopia. With a total sample size of 15355 individuals he employs a multinomial Logit model and includes individual as well as household characteristics. Among the variables are the age of the child, his or her sex, whether he or she is a child of the household head, the size of the household and the number of children less than 5 years old in the household. Dummy variables are used to account for the education the child has already attained. Since household income could suffer from an endogeneity problem it is proxied by household wealth which in turn is measured by ownership of a corrugated iron house. Like Cockburn and Dostie, Senbet considers in particular the role of access to productive assets. Increased access to assets need not increase child schooling, because it increases the productivity of household members including children (especially in an incomplete labor market). Productive assets enter the equation in the form of dummy variables for ownership of crop land, cattle, sheep/goat and cash crops. (Limitations in the data set do not allow for levels of asset holdings.) Further variables are the distance to the nearest water source and the age and gender of the household head.

Senbet investigates the probability that a child works or attends school as compared to being able to enjoy leisure time as a reference group and the probability that a child works as

compared to attending school and also analyses boys' and girls' probabilities separately. His analysis shows that school participation increases with child age and for children that are direct offspring of the household head. The number of infants in the household increases the probability of working as opposed to schooling for girls which Senbet contributes to higher household demand for domestic work. The age of the household also increases the probability of working as compared to leisure and schooling for children. The author suggests that a potential reason for this could be that the returns from child schooling are more uncertain for older household heads. Ownership of cropland increases the probability of working for boys but decreases the same probability for girls. This is in line with the traditional gender specific division of labor - boys work mainly in field activities while girls take over domestic work. Ownership of cash crops increases the probability of boys attending school as opposed to working, the other asset variables are not significant.

Weir (2010) investigates the role of parental attitudes in school attendance rates. She uses the 1994 wave of the Ethiopian Rural Household Survey which covered 1477 households in 18 peasant associations located in 15 different *Woredas* (regions) and a survey of household human resources in four of the fifteen *Woredas*, the Education Sub-Sample Survey (ES-SS). Weir employs OLS regressions to investigate the determinants of positive attitudes towards schooling. Interestingly, neither income (measured by consumption per adult equivalent) nor land holdings per capita are among the significant factors. The attitudes of fathers are positively influenced by the years of formal schooling they have had and negatively by their age. Educational attainment is neither significant for fathers nor for mothers. The number of school-age girls in the household is negatively associated with fathers' and positively associated with mothers' attitudes. 30% of parents did not send any of their children to school despite reporting positive attitudes to schooling which indicates a heavy budget constraint on their decisions. To examine this aspect more closely Weir uses a Probit specification to estimate the probability of school enrollment of 7-18 year olds with the parental attitudes but also characteristics of the child, the parents and the household as independent variables.

The results show among other aspects that age increases the probability of enrollment but at a declining rate. This could be because earlier-born children provide returns to education sooner and contradicts the idea that income from older children might be needed to fund younger siblings' schooling. The coefficients for the number of very young and older family members were insignificant, thus suggesting that older children do in general not take care of family members at the expense of schooling. Children in female-headed households are more likely to attend school. Income (consumption per adult equivalent) has no significant impact, but school fees decrease schooling probability, especially for girls. Land per

household member has a significant positive effect which shows that the “income effect” dominates the “substitution effect” that stems from labor becoming more productive when assets are owned by the household. Also, ownership of ploughs and large animals affect schooling positively, while ownership of small animals decreases the probability of school attendance. This fits very well into the idea that schooling’s opportunity costs are particularly important, because ploughs and large animals are generally used or tended respectively by adults while small animals are tended by children. Parental schooling is not significant once the cognitive skills and attitudes towards education of the parents are being controlled for.

When looking at girls and boys separately age is significant in explaining boys’ school attendance whereas birth order is weakly significant (at the level of 0.20) for girls. The number of small animals owned by the household and the distance to the nearest water supply have a stronger negative impact on the enrollment of boys than of girls which is again in line with the gender-specific division of labor.

3. Description of the Data:

3.1 The Survey

The Ethiopian Rural Household Survey is a household dataset that covers households in different villages in different regions of rural Ethiopia. Data collection started in 1989. The International Food Policy research Institute (IFPRI) conducted a survey in seven different Peasant Associations in the regions Amhara, Oromiya and the Southern Ethiopian People's Association (SNNPR) where consumption, income and asset data of about 450 households were collected. The main aim was to study households' response to food crises. The second round of the survey, conducted in 1994, included 15 villages. Further rounds were conducted in late 1994, 1995, 1997, 1999, 2004 and 2009. The present study uses data from the 2009 round of the survey which includes 1576 households in 18 peasant associations (villages) in 18 *Woredas* (districts) in 4 regions. Each peasant association is in a different *Woreda*. The number of individuals living in these households is 9089, additionally certain information about former members is provided.

For the 1989 survey households were randomly selected within each Peasant Association. The Peasant Associations were mainly areas that had suffered from famine and drought in the 1980s. The 1994 survey included nine additional villages that were selected to take account of the diversity of farming systems in Ethiopia. Within each village, random sampling was applied and it was attempted to re-randomize the villages from the 1989 wave. The data are not nationally representative but can be considered broadly representative of non-pastoralist areas (Dercon and Hoddinott 2011: 8).

The survey includes information on many different areas: characteristics of household members such as age, gender, marital status, occupation, highest educational grade attained, child mortality, children's education and activities, assets of the household such as agricultural tools, loans taken, non-food expenditure, off-farm income and business activities, perceptions on well-being, trust and poverty, land acquisition and use, crops grown, plot output, agricultural inputs, livestock, risk and time preferences of the household head, health status, consumption habits, food expenditure, women's activities and their participation in village-life and decision-making, shocks threatening the basis of existence such as drought or confiscation of assets and supportive networks.

The respondent to the interviewer's questions is usually the household head. Only if several attempts to interview him or her without success are made, the most knowledgeable person about the topics of the survey shall be asked.

3.2 School Attendance

As I investigate the determinants of schooling with this study I will start with a discussion of the dependent variable, school attendance:

In Ethiopia children start primary school at a minimum age of seven years. Before, there is kindergarten which can be entered from the age of four years on. Primary education consists of two four-year cycles. The first cycle is supposed to teach functional literacy while the purpose of the second cycle is to prepare for further education. After completion of the eighth grade the child – with a theoretical entrance age of 15 years by then - is allowed to enter the first cycle (grades 9 and 10) of secondary school which represents the final part of general education and is supposed to enable students to identify areas of interest for further training. Higher secondary education can either take the form of the second cycle of secondary school (grades 11 and 12) which is intended to prepare students for higher education, of primary school teaching programs lasting either one (for first cycle primary school teaching) or three years (for secondary cycle primary school teaching), of technical/vocational education training (TVET) lasting 1 to 3 years depending on the vocation (1 year: hairdressing, cooking, midwives, knitting; 2 years: electrician, plumbing; 3 years: nursing, business accountants) or of a pre-school teaching program lasting less than a year. Upon completion of the second cycle of secondary school, young adults – with a theoretical age of 19 at this point – are entitled to enter the higher education system. Undergraduate (Bachelor) degrees generally take three to four years to complete, five years in the case of law and pharmacy and six years in the case of medicine and veterinary science. A secondary teaching diploma takes four years. Masters degrees require completion of a bachelor study and usually take two to three years. Ph.D. degrees require completion of a master's program and take three to four years. (Cf. UNESCO 2010 and UNESCO 2012)

In the Ethiopian Rural Household Survey of 2009 the household head is asked by the interviewer for each individual living in the household and between 4 and 21 years old if the person in question has been attending school in the last 12 months. Answers to this question can either be "yes", "was attending but discontinued in the last 12 months" or "no".

After sorting out observations where the household head did not know the answer, and where it is apparent that an erroneous answer was given or an answer was given although the individual in question was not in the above-mentioned age range there remain 2811 individuals that are reported as having attended school, 149 that are reported to have quit attending school within the last 12 months and 482 that did not attend school. This makes for

a net enrollment rate of 81.67%. When we focus only on 7- to 15-year-olds (the age of primary school attendance), the rate increases to 89.04%. This high level of schooling among children, particularly children living in rural areas, comes at a surprise. It is even higher than the 2010 net enrollment rate for Ethiopia as a whole (and thus including rural and urban areas) published by the World Bank (2012) which is 81%. A possible explanation might be that pastoralist communities are strongly underrepresented in the ERHS.

I decide to add the children who dropped out in the last 12 months to the group of the non-attending children. Temporary interruption of schooling is not infrequent in Ethiopia, and it is thus likely that not only the group of those that quit school recently is of substantial size, but also the group of those who recently took up schooling again. The latter can however not be identified within the group of those currently enrolled in school. Therefore, omitting those who recently dropped out would potentially lead to a bias.

3.3 Variables on the Individual Level

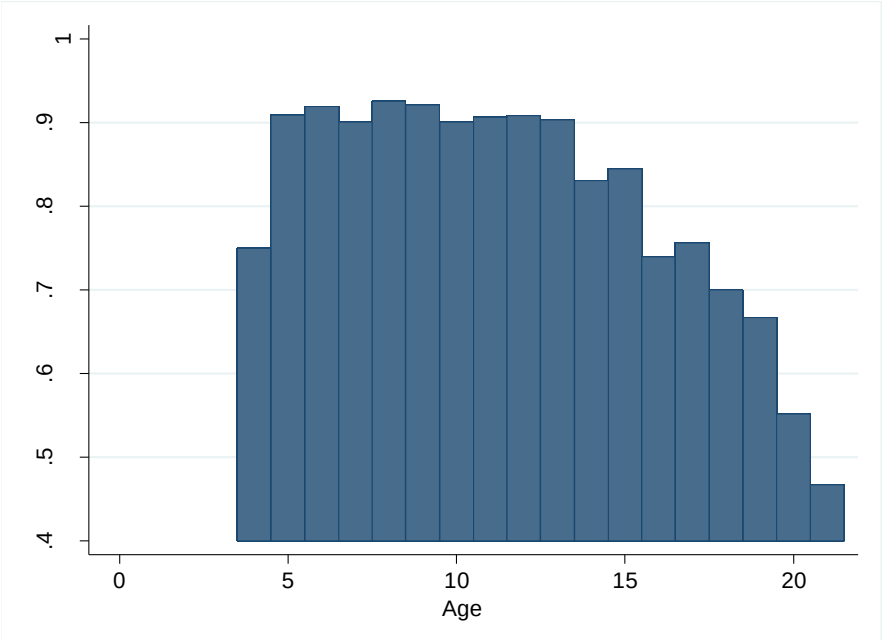
Independent variables are separated into those at the individual level and those at the household level.[6] Individual level variables are age and gender of the child, their educational level as attained until now, their main occupation and the time they spend on various activities. Household level variables are income (proxied by food consumption), assets in the form of land, tools and animals, the number of children and elderly in the household, education of parents, age and gender of the household head, the risk and time preferences of the household head and regional dummies.

3.3.1 Age

We first look at age. As figure 1 shows the net enrollment rate is already very high (over 90%) among 5 year old children. It starts to continually decrease at the age of 14. The highest net enrollment rate (92.59%) is at age 8.

[6] This is not to say that household level variables have the same effect on all children living in a household, the term "household level" refers to the fact that these variables are attributable to the household and not to the individual children.

Figure 1. *Net Enrollment Rates until the Age of 21*



As Table 1 reveals the mean age of those not attending school is not only more than half a year higher than the one of those attending school but this difference is also found to be highly significant.

The observations for children below 7 years old (the minimum age for compulsory schooling) are discarded because information about non-attendance is rarely given (despite being asked for in the survey).

Table 1. *Mean Age of 7 to 15-year-old children dependent on Attendance of School*

	Attending school	Not attending school	t-statistic
Age	11.42	12.05	3.78***

*** p<0.01, ** p<0.05, * p<0.1

(The null hypothesis is equality of means for children attending and not attending school.)

3.3.2 Gender

Looking at children's gender, it has to be noted that interestingly, there is a higher enrollment rate among girls than among boys. While only 79.30% of boys attend school, 84.26% of girls do. If we compare net enrollment rates for different age groups for girls and boys, there

seems to be a roughly constant advance of girls that becomes larger after the age of fifteen when primary education is usually completed:

Figure 2. *Net Enrollment Rate for Girls until the Age of 21*

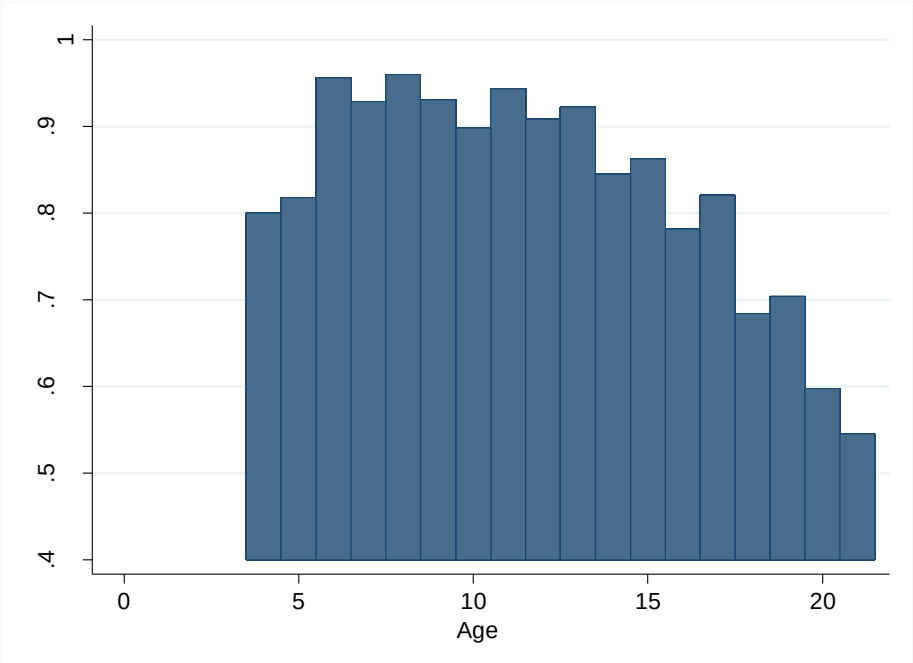
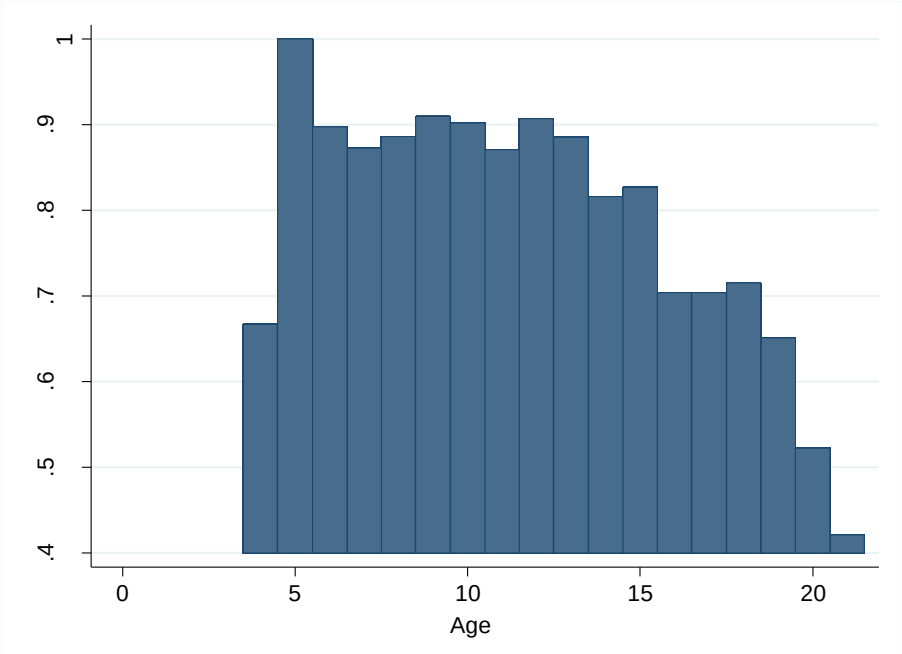


Figure 3. *Net Enrollment Rate for Boys until the Age of 21*



However, this educational advantage of girls – especially from 15 onwards – could be due to a bias related to out migration of girls at marriage. As Ezra and Kiros (2001) report, 79% of female migrants migrate at the time of marriage and the average marriage age is 16 years. Including high-school age children can thus easily lead to a selection bias. I avoid this bias by excluding over 15 year olds and restricting the analysis to children of primary school age (7-15 years).

3.3.3 Educational Level

Another important variable at the individual level is the educational level already attained. The ERHS provides information about each grade attained for primary and secondary education (until a theoretical age of 19). Information about university and non-university higher education (such as completion of teaching programs) is only specified in terms of being "complete" or "incomplete". Further options for higher education are participation in literacy programs and in church or mosque school education. Due to the sample size I construct dummy variables for aggregated groups: The reference group are children without any completed schooling. The dummy variable "*some primary school*" stands for completion of at least grade 1 and grade 3 at the most, "*primary school, first cycle*" stands for completion of at least grade 4 and grade 7 at the most, and "*primary school*" stands for completion of at least grade 8 and grade 9 at the most. "*Secondary school, first cycle*" means that at least grade 10 and eventually the first year of the second cycle of secondary school or part of a primary school teaching program or of a technical/vocational education training (TVET) have been completed while "*secondary school*" stands for the completion of at least grade 12 and of a part of a university degree at the most. "*Higher*" stands for the completion of a non-university program after completion of the first cycle of secondary school and "*university*" equals the completion of at least a bachelor degree. "*Literacy program*" indicates that no formal schooling was received and participation in a literacy program is the highest level attained. These programs usually have a duration of less than a year (cf. Abadzi 2003). "*Church/Mosque*" stands for education (of indefinite length) in church or mosque school being the highest grade attained which again means no formal schooling was received by the person.[7]

[7] Unfortunately, it remains unclear whether participation in a literacy program or schooling in church or mosque school is regarded to be the higher education level.

Table 2. *Educational Dummy Variables*

Dummy variable	Highest grade attained	Theoretical age
No education (Reference group)	-	0 - 7
Some primary schooling	Grade 1 - 3	8-10
Primary school, first cycle	Grade 4 – 7	11-14
Primary school	Grade 8 – 9	15-16
Secondary school, first cycle	Grade 10, Grade 11 (either in the second cycle of secondary school, in a primary school teaching program or in a TVET)	17-18
Secondary School	Grade 12 (in secondary school), Grade 12 or higher (in primary school teaching programs or TVET), part of a bachelor's degree at university	19 – 22+
Higher	Non-university higher education (such as secondary school teaching programs)	22+
University	Bachelor's program	22+
Literacy program	Participation in a literacy program (usually lasting less than a year)	-
Church/Mosque school	Participation in educational activities provided by church/mosque schools	-

In Table 3 and figure 4 we can see that more than 89% of those, whose data about their education attained are given, have only received education up to completion of the first cycle of primary schooling or to an even lower grade, have received only education in a literacy program or in church/mosque school or have received no education at all. The same applies to more than 86% of over 21 year olds. Despite the education reforms in place since 1994 the overall level of education in the population remains low.

Table 3. *Highest level of education*

	all people			over 21 year olds		
	Freq.	% of individuals	Cum.	Freq.	% of individuals	Cum.
No education	2,862	36.44	36.44	1,734	47.48	47.48
Some primary schooling	1,603	20.41	56.86	379	10.38	57.86
Primary school, first cycle	1,834	23.35	80.21	557	15.25	73.11
Primary school	544	6.93	87.14	193	5.28	78.40
Secondary school, first cycle	328	4.18	91.32	168	4.60	83.00
Secondary school	46	0.59	91.90	41	1.12	84.12
Non-university higher education	24	0.31	92.21	22	0.60	84.72
University	13	0.17	92.37	9	0.25	84.97
Literacy program	495	6.3	98.68	482	13.20	98.17
Church/Mosque school	104	1.32	100	67	1.83	100.00
Total	7,853	100		3,652	100	

Figure 4. *Highest education level among all people*

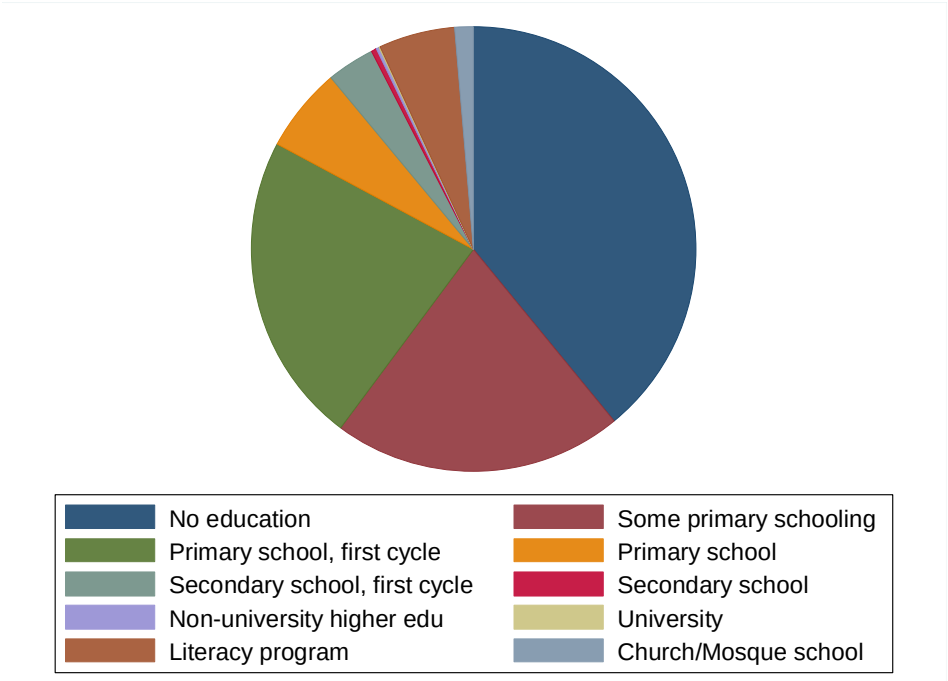
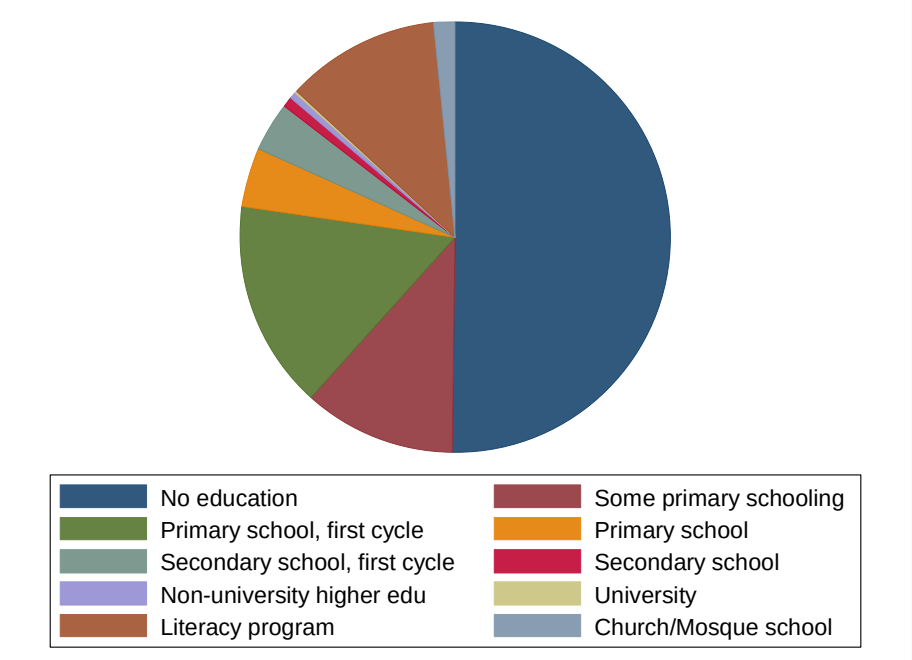


Figure 5. *Highest education level among people aged > 21*



Attendance rates are highest for those who have completed primary education so far.[8]

Table 4. *Education level and school attendance (4 – 21 years of age)*

	attending school		not attending school		
	Freq.	% of all at same education level	Freq.	% of all at same education level	Total
No education	207	83.47	41	16.53	248
Some primary schooling	934	78.69	253	21.31	1187
Primary school, first cycle	1045	83.53	206	16.47	1251
Primary school	309	89.05	38	10.95	347
Secondary school, first cycle	101	63.92	57	36.08	158
Secondary school	2	40.00	3	60.00	5
Non-university higher education	1	50.00	1	50.00	2
University	4	100.00	0	0.00	4
Literacy program	5	55.56	4	44.44	9
Church/Mosque school	14.00	66.67	7	33.33	21
Total	2622		610		

[8] As Table 4 reveals, all 4 people that have already completed a university degree stay enrolled in university. Thus the attendance rate for people with a university degree is even larger than the one for those who completed primary schooling. However, as the theoretical age for completion of bachelor's degrees is 22 years in Ethiopia , these 4 observations could easily be flawed. This will not be considered any further, since the sample is restricted to people below 16 years old anyway.

In the sample of interest, that contains only children between the ages of 7 and 15 years, secondary and tertiary education are not considered (Table 5).[9] As for all people between 4 and 21, the attendance rate is highest for those who have completed primary school.

Table 5. *Education level and school attendance (7 – 15 years of age)*

	attending school		not attending school		
	Freq.	% of all at same education level	Freq.	% of all at same education level	Total
No education	166	84.69	30	15.31	196
Some primary schooling	861	86.27	137	13.73	998
Primary school, first cycle	668	92.91	51	7.09	719
Primary school	55	96.49	2	3.51	57
Literacy program	3	50.00	3	50.00	6
Church/Mosque school	8	88.89	1	11.11	9
Total	1761	88.72	224	11.28	1985

3.3.4 Main Occupation

Next, the main occupation of children is discussed. Table 4 shows the number of young people between 7 and 15 for whom each occupation was reported as their primary occupation by the household head. Since there are non-negligible differences in main occupation by gender, the information is also given for girls and boys separately.[10]

Table 6. *Primary occupation of young people aged 7 – 15*

	Boys		Girls		Total	
Occupation	Freq.	% of individuals	Freq.	% of individuals	Freq.	% of individuals
Farmer or family farm worker	51	4.58	8	0.77	59	2.72
Domestic work (incl. housewife)	17	1.53	73	6.99	91	4.19
Manual worker	2	0.18			2	0.09
Driver/mechanic	1	0.09			1	0.05
Health worker			2	0.19	2	0.09
Trader	1	0.09	2	0.19	3	0.14
Student	983	88.24	954	91.29	1,948	89.73
Not in Labor Force	2	0.18			2	0.09
Herding	56	5.03	6	0.57	62	2.86
Religious worker	1	0.09			1	0.05
Total	1,114	100.00	1,045	100.00	2,171	100.00

[9] The observations of children who have completed a higher level than primary school are discarded: Firstly, since they are few and completion before the theoretical age could easily be a measurement error, they are especially error-prone. Secondly, they show very little variation

[10] Note that there is information about attendance status but not gender for 12 people in the age group.

It can be seen that by far the most widespread main “occupation” is to be a student which is perfectly in line with the high net enrollment rate. The most widespread other occupations for boys are farm work, herding and domestic work. If girls do not have student listed as their main occupation, their primary occupation is most likely domestic work. Few girls engage in herding or farming.

Drawing on these results I create dummy variables for farming, domestic work, herding and the group of “other primary occupations”. The reference group are those of whom the head declares being a student as their main occupation. As visible in Table 7, only between 11 and a little more than 16% of those for whom one of the three most widespread work activities was reported as their main activity attend school. On the contrary, more than 97% of those for whom “student” was reported as their main activity go to school.

Table 7. *Primary occupation of young people aged 7 – 15 and School Attendance*

	Attending School		Not attending School		Total
Occupation	Freq.	% of all with same main occ.	Freq.	% of all with same main occ.	Freq.
Student	1902	97.64	46	2.36	1948.00
Farmer or family farm worker	8	13.56	51	86.44	59.00
Domestic work (incl. housewife)	10	10.99	81	89.01	91.00
Herding	10	16.13	52	83.87	62.00
Other occupation	3	27.27	8	72.73	11.00
Total	1933.00	89.04	238.00	10.96	2171.00

3.3.5 Time use

The ERHS also includes information on the time spent each week on different activities by young people between 4 and 21. The four activities are: “Domestic tasks (fetching water, firewood, cleaning, cooking, child care etc.)”, “Work on family farm, cattle, herding, other family business”, “Working for pay outside of the household” and “studying at home”. This information is of course very valuable and thus also used. Table 8 shows the mean values of weekly hours for the 4 different activities for all 4 - 21 year olds and specifically for our age group of interest (7 – 15 year olds). Again, the information is also reported for girls and boys separately.

Table 8. *Mean hours per week spent on different activities*

	4 - 21 year olds				7 - 15 year olds			
Activity	Total	Girls	Boys	t-statistic	Total	Girls	Boys	t-statistic
Domestic tasks	13.22	19.18	7.74	-24.52***	13.67	19.20	8.37	-24.79***
Farm work	13.53	7.00	19.47	27.93***	14.39	7.95	20.48	21.80***
Paid work outside the household	1.03	0.84	1.21	1.19	0.29	0.37	0.21	-1.30
Studying at home	7.94	7.89	7.96	0.26	8.30	8.27	8.31	0.12

*** p<0.01, ** p<0.05, * p<0.1

(The null hypothesis is equality of means for boys and girls.)

This table provides interesting insights: First of all, it supports the notion that the labor market in rural Ethiopia is non-functioning (Cf. Cockburn and Dostie 2007). While young people spend on average more than 13 hours a week working on the farm or in the household, they only spend less than half an hour per week working for pay outside the household. It should be added that only 33 out of 2638 people between 7 and 15 years spend any time working for pay outside the household at all![11] Second, it shows us that boys and girls spend about the same amount of time per week working as well as studying. Concerning the types of work however, there is a clear-cut, almost mirror-inverted and highly significant division of labor by gender: While boys spend more than 20 hours on farm work each week and only about 8 and a half hours on domestic work, girls spend more than 19 hours on domestic work and only about 8 hours on farm work.

The means of hours spent on the four activities are significantly different for those that attend school and those who do not. The differences are particularly large for studying and farm work. The fact that they are much smaller for paid labor outside the household can be explained by the fact that a very small group works outside the household anyway. Yet, also the difference for time spent on domestic activities is very small indicating that household work might be easier to reconcile with school attendance than farm work.

[11] Cf. Admassie and Bedi 2003: 9-11 and Cockburn and Dostie 2007: 523 – 532 for a theoretical discussion on the effect of a constrained labor market on child work and schooling.

Table 9. *Mean hours per week spent on different activities among 7 - 15 year olds and school attendance*

Activity	Attending school	Not attending school	t-statistic
Domestic tasks	13.12	16.68	4.31***
Farm work	12.81	21.52	8.76***
Paid work outside the household	0.12	1.38	6.22***
Studying at home	11.07	1.59	-20.45***

*** p<0.01, ** p<0.05, * p<0.1

(The null hypothesis is equality of means for children attending and not attending school.)

3.4 Variables on the Household Level

3.4.1 School Attendance on the Household Level

The ERHS provides a lot more information on the household level than it does on the individual level, so there are a lot more potential variables to choose from.

Again, first the dependent variable, school attendance, is discussed. At the household level, the values of independent variables apply to a whole group of children, namely those living in the same household. The attendance status for those children could be different, i.e. not all children in a household need to be attending or not attending school. This could complicate the analysis, since the same variable can have a different effect on different children in the same household and effects could thus cancel each other out.

To get a first impression, table 10 shows the enrollment rate for 7 to 15-year-olds per household:

Table 10. *Share of children of primary schooling age in a household who are enrolled in school (only households with at least one child in primary schooling age)*

Share	Freq.	% of Households	Cum.
0	74	9.20	9.20
0.33	7	0.87	10.07
0.5	27	3.36	13.43
0.6	1	0.12	13.56
0.67	12	1.49	15.05
0.75	12	1.49	16.54
0.83	2	0.25	16.79
0.86	1	0.12	16.92
1	668	83.08	100.00
Total	804	100.00	

More than 83% of households with children of primary schooling age send all their children within that age group to school and more than 9% none of them. Less than 10% send neither all nor none of their 7 to 15 year-old children to school which allows household effects to work towards an increase and a decrease of attendance at the same time. Less than 3.5% of households send exactly half of their children aged 7 - 15 to school. It would thus be an option to just discard the 107 out of 1126 households where some children attend and others do not attend. However, these might be interesting cases concerning economic considerations by the household such as weighing between investing into education and using a child's labor force. I therefore choose attendance of the oldest child in the age group from 7 to 15 to be the dependent variable of my household level investigation. This means that two things have to be kept in mind: First, households where the younger children still attend school while the older have dropped out already show up as "non-attenders" in my specifications. These households are not rare as younger children have a very high attendance rate as shown further above. Unfortunately, age cannot be controlled for on the household level. Second, Weir (2010: 102) showed for the 1994 wave of the ERHS that first children are more likely to be enrolled and that each older sibling declines the probability of enrollment by more than 5 percentage points. If this relationship still holds for 2009, my investigation counts too many households as "attenders" even though some children in the respective households are not attending school. These biases can however only be overcome at the cost of mixing individual and household characteristics.

The low level of school attendance among the older children could of course reflect a common practice of leaving school in the course of or after primary education or at fifteen respectively. However it could to some extent also be an effect of a human capital maximization strategy of households, namely to let the older offspring work in order to finance the education of the younger.[12] Of course, even if education levels among older cohorts are equal to those of younger ones that could be a consequence of a human capital maximization strategy, namely in the case that human capital acquired by a person has declining returns to scale and thus an equal distribution over all household members is the most efficient strategy. Yet, also if younger cohorts have a substantially higher education level than older ones it is very likely that this is to a large extent due to better education infrastructure and possibilities: As mentioned above, the New Ethiopian Education Policy was already adopted in 1994 and investments into education have taken place since.

[12] Cf. Chesnokova and Vaithinathan 2008 for a theoretical discussion of the topic. Empirical evidence for Taiwan comes from Parish and Willis (1993). However, educational advantages of first-borns were however found for Ghana by Lloyd and Gage-Brandon (1994) and Kenya by Gomes (1984).

3.4.2 Income

One important aspect in any investigation of schooling determinants is of course income. The ERHS provides detailed information on income and expenditure. Among other things, the head of household is asked about revenues from crop sales, employment of household members off the household's land or income earning activities such as crafts, trades and other businesses within the last 12 months and how much was earned by the household member in birr[13] or in kind in the last 4 months or if the work was part of a traditional labor sharing agreement.

However, as I am especially interested in long-run income I choose food consumption expenditure per capita as an income proxy. Given that households smooth consumption over time and food consumption even more so, consumption expenditure better represents permanent income than momentary income at the time the survey was taken (cf. Behrman and Knowles 1999). Measurement errors are also less likely for food consumption than for income, because – as mentioned above - income is earned in sectors as diverse as agriculture, craft, trade, business and work in exchange for a wage and is sometimes paid in kind or generated with the help of traditional labor sharing agreements. Besides, since subsistence agriculture is widespread, monetary income alone would not be representative of households' welfare (cf. Cockburn and Dostie 2007: 533 – 534 and Mani et al. 2009: 8).

Food expenditure of the household consists of food items purchased, out of own stock and received as gifts and of purchased meals. They include all food consumption in the last week, scaled to a month. Quantities were converted from local measurement units into kilograms or litres. The monetary value of consumption was calculated using consumption price data (Dercon and Hoddinott 2011). In Table 11, a clear albeit not significant difference in mean income (proxied by food consumption) is visible for households where the oldest child in the age range from 7 to 15 attends school and those where he or she does not attend school. As one would expect households where the child attends school have higher food consumption expenditure per capita.

[13] The birr is Ethiopia's currency unit. One birr equals about 0.045 €. (Cf. European Commission 2012) However, it has to be noted that this is a nominal exchange rate.

Table 11. *Mean of various Variables and Attendance of Oldest Child in Primary School Age (7-15 years old)*

	Attending school	Not attending school	t-statistic
Per Capita Food Consumption in Household	153.21	140.62	-1.01
Land (ha)	1.09	1.06	-0.21
Large Animals	9.16	1.63	-0.59
Small Animals	7.47	8.96	-1.39
Hoes	3.01	3.26	0.76
Ploughs	4.82	4.29	-0.90
Household Members under 7 years old	1.08	1.08	-0.03
Household Members between 7 and 19 years old	2.93	2.77	-1.03
Household Members between 20 and 64 years old	2.39	2.25	-1.12
Household Members over 64 years old	0.27	0.32	0.92
Age of Head of Household	50.54	50.24	-0.20
Time Preferences (Consumption in one month vs. now)	280.55	278.88	-0.07
Time Preferences (Consumption in two months vs. one month)	360.85	383.59	0.59

*** p<0.01, ** p<0.05, * p<0.1
(The null hypothesis is equality of means for households where the oldest child in primary school age attends school and those where he or she does not attend school.)

3.4.3 Land and Assets

Next we turn our attention to asset variables: As already mentioned asset variables are very important to consider because on the one hand they can help increase child schooling by making the household wealthier, but can also contribute to a decrease in child schooling, because their use can make child work more productive. If they are not included in the equation one can easily get the wrong idea that income is a schooling-decreasing factor.

According to Cockburn and Dostie (2007: 537) land and livestock are key assets in rural Ethiopia. Land is total land per household in hectares. To get a first idea, I look at people living in households that own land and those that do not own land: In the sample 81.23% of people and 83.61% of people between 4 and 21 live in households that have land. On first glance, land ownership seems to cause a small substitution effect away from schooling into work: The enrollment rate for children who are oldest in the primary school age range living in households with land is 86.81%, the one for those living in a household with no land is 88.37% (Table 12). The mean size of land is also slightly higher for those households where the oldest attends school as Table 11 shows. The difference is not significant however.

Table 12. *Enrollment Rate for Children oldest within Primary School Age Range in Households with Land or no Land*

Households owning Land	86.81% (675 obs.)
Households owning no Land	88.37% (129 obs.)
Total	87.06% (804 obs.)

Another important kind of asset are livestock. The most widespread animals are calves, bulls, oxen, heifer, cows, sheep, goats, horses, donkeys, mules, camels, young bulls, chicken and beehives, while other animals such as cross breeds are rarely held. The average household in the sample owns 4 chicken, 3 or 4 oxen, 3 sheep, 2 calves, between 1 and 2 bulls, 1 or 2 goats, 1 cow, 1 donkey, no or 1 heifer and beehive and no young bulls, horses or mules. I consider sheep, goats, oxen, bulls, cows, calves and chicken, because they are the most widespread, but at the same time for each of these animals there is a substantial number of households that do not own any at all. I create two groups: large (cows, bulls, oxen) and small (sheep, goat, calves, chicken) animals with each of these groups' influence on child productivity in mind.

The mean number of large animals is a lot larger for households where the oldest attends school as Table 11 shows. The number of small animals held is however larger for households where the oldest does not attend school. These results make sense, because children can work with small but cannot work with large animals. At the same time the number of large animals apparently works as an income proxy here as well. Again, the results are insignificant.

A third important group of assets are tools. I choose hoes and ploughs in the hope that they make for interesting results, because ploughs might be used by adults only while hoes might also be used by children (cf. Cockburn and Dostie 2007 and Weir 2010).

One can see in Table 11 that the number of ploughs possessed is slightly larger for households where the child attends school while the number of hoes is smaller. This can be explained by considering that hoes make child labor more productive, while ploughs cannot be used by children. The higher attendance for families that use ploughs is most likely due to the variable's effect as an income proxy. It must be added that once again the relationship is not significant.

3.4.4 Household Composition

If we keep our focus on the child schooling vs. child labor decisions of households, another aspect that should be of considerable importance is the structure of the household: Is it a household with many children? Then it is quite likely that older children will have to take care of their younger siblings. The same applies if it is a household with many older household members. As it is already clear that the bulk of domestic work is performed by girls, the family structure should also have a much stronger impact on their school attendance.

Variables include the number of children under 7 (school entrance age), the number of young people between 7 and 19 (primary and secondary schooling age), the number of adults from 20 to 64 and the number of older people over 64 years old.

More very young children and very old people in the household make child work more productive while the presence of other young people or adults takes away from the pressure to work for the household. It could lead to a reduction in working hours and thereby help increase enrollment.

The presence of child-labor intensive assets or very young or elderly household members that might have to be taken care of should allow for similar insight on the household level as the occupation of the children and their time spent on the four different activities allows on the individual level.

Also regarding household composition Table 11 confirms again the expectations based on children's work productivity, but results are insignificant. Indeed, the mean number of young people between 7 and 19 years and of adults between 20 and 64 is larger for the households where the child attends school and the mean number of people over 64 years old.

3.4.5 Education of Parents

Another important factor is education of parents. The ERHS allows for the identification for mothers and fathers of persons under 22 years old. If we were to use of this information for the individual level analysis a potential problem would be that not all young people living in the same household have the same parents but a lot of them do. However, at the household level where I restrict myself to the analysis of attendance of the oldest child within primary schooling age this is not a concern. The education of the parents should at the same time also be indicative of either the head's education or – if he or she is from an earlier generation – his or her preferences and attitudes towards schooling.

By far the most mothers of all children who are the oldest in the primary schooling age range in their household have not received any education at all as can be seen from Table 13. In fact, there are more mothers who have not received any education than there are mothers who have received some sort of education and this includes even literacy programs and church or mosque school. The same cannot be said about the schooling of fathers. Although the group without any education is still the largest, it contains less than a third of all fathers.

Table 13. *Education level of mothers and fathers in households with children in primary school age*

	Mother's education level		Fathers' education level	
	Freq.	% of Households	Freq.	% of Households
No education	332	55.89	132	28.33
Some primary schooling	69	11.62	59	12.66
Primary school, first cycle	70	11.78	120	25.75
Primary school	11	1.85	38	8.15
Secondary school, first cycle	11	1.85	17	3.65
Secondary school	4	0.67	9	1.93
Non-university higher education	0	0.00	1	0.21
University	0	0.00	0	0.00
Literacy program	96	16.16	83	17.81
Church/Mosque school	1	0.17	7	1.50
Total	594	100.00	466	100.00

Figure 6. *Highest education level of mothers*

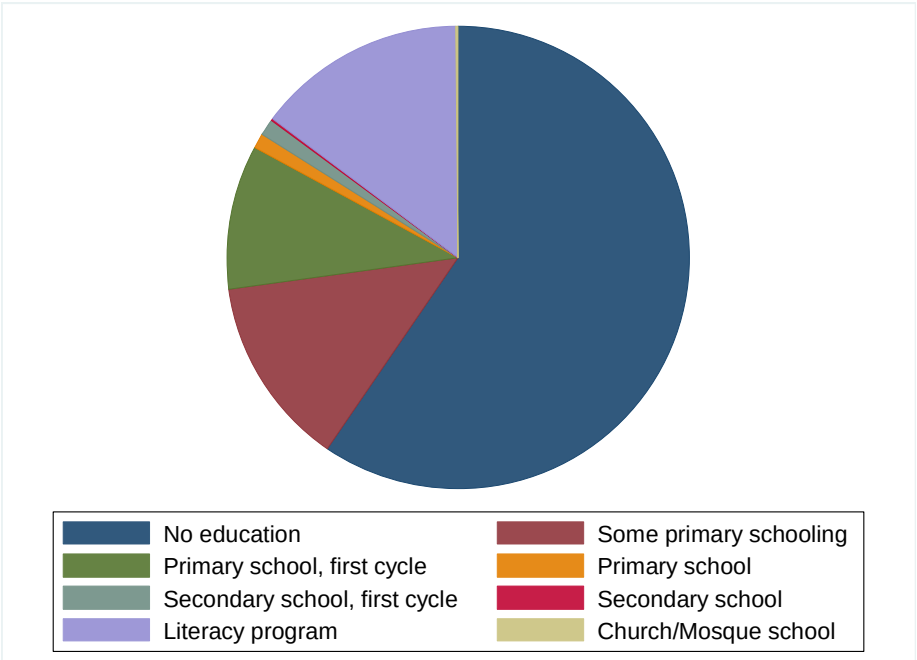


Figure 7. *Highest education level of fathers*

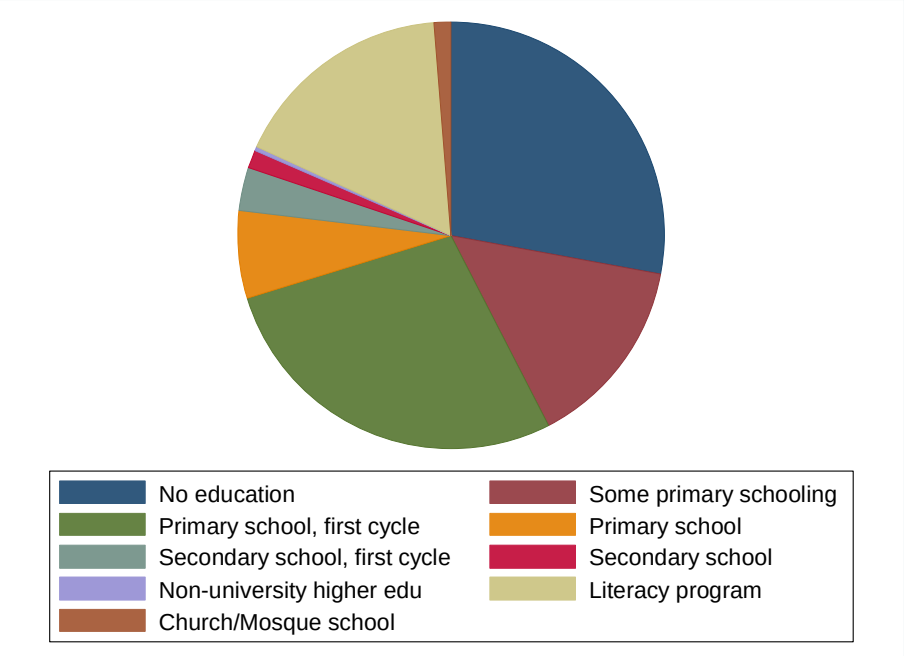


Table 14. *Education level of mothers*

	Oldest child in primary school age attending school		Oldest child in primary school age not attending school		Total
	Freq.	% of mothers with same edu level	Freq.	% of mothers with same edu level	Freq.
No education	286	86.14	46	13.86	332
Some primary schooling	64	92.75	5	7.25	69
Primary school, first cycle	65	92.86	5	7.14	70
Primary school	9	81.82	2	18.18	11
Secondary school, first cycle	11	100.00	0	0.00	11
Secondary school	4	100.00	0	0.00	4
Non-university higher education	0		0		0
University	0		0		0
Literacy program	82	85.42	14	14.58	96
Church/Mosque school	1	100.00	0	0.00	1
Total	522	88.00	72	12.12	594

Table 15. Education level of fathers

	Oldest child in primary school age attending school		Oldest child in primary school age not attending school		Total
	Freq.	% of fathers with same edu level	Freq.	% of fathers with same edu level	Freq.
No education	119	90.15	13	9.85	132
Some primary schooling	51	86.44	8	13.56	59
Primary school, first cycle	107	89.17	13	10.83	120
Primary school	35	92.11	3	7.89	38
Secondary school, first cycle	15	88.24	2	11.76	17
Secondary school	7	77.78	2	22.22	9
Non-university higher education	1	100	0	0.00	1
University	0		0		0
Literacy program	64	77.11	19	22.89	83
Church/Mosque school	7	100	0	0	7
Total	406	87.12	60	12.88	466

Attendance rates are higher for children whose mother has had some primary schooling or even finished the first cycle of primary school as opposed to children whose mother has had no schooling at all (Table 14). For fathers (Table 15) no such clear effect is discernible.

3.4.6 Age and Gender of the Head of Household

The age of the household head is of interest because older household heads could have a less favorable view towards education of the younger household members or be less experienced in assessing the cost-benefit ratio of schooling.[14] Also they could possibly value the future returns to education less due to their own age. Contrary to what one might expect in Table 11 the mean age of the head of household is even slightly (even if again insignificantly) larger for households where the oldest child in primary school age attends school.

Gender of the head of household is also added in order to find out if it influences school attendance. It might also be possible that a female head of household would have an influence on girls' schooling but not on boys'.

[14] Consider that widespread education reforms did not take place before 1994.

Table 16. *Gender of the household head*

	Oldest child bw. 7 -15 attending school		Oldest child bw. 7 - 15 not attending school	
	Freq.	% of Households with head of same gender	Freq.	% of Households with head of same gender
		Oldest child bw. 7 - 15 is male		
Head is male	270	86.26	43	13.74
Head is female	76	79.17	20	20.83
		Oldest child bw. 7 - 15 is female		
Head is male	249	87.99	34	12.01
Head is female	96	93.20	7	6.80
		Total		
Head is male	519	87.08	77	12.92
Head is female	173	86.50	27	13.50

Looking at the oldest child in the household in primary school age again, boys' and total enrollment rates are relatively higher when the head is male, while girls' enrollment rates are higher under female heads as Table 16 shows.[15]

3.4.7 Time Preferences of the Head of Household

For the 2009 wave of the ERHS some questions that had not been asked in the waves before were asked. Among them were questions to the household head regarding his risk and time preferences. As education equals a sacrifice in present earnings and/or leisure time which should be compensated by higher earnings in the future one would strongly assume that a relationship exists between the head of household placing a low discount on future returns and the school attendance of children in the household.

However, there is not only a considerable time span between an investment into education and the rewards of this investment, but the rewards are also not for sure, because it is not clear if the individual can complete schooling or up to what point he or she can complete grades and what the size of the wages or of the profits which constitute the returns to

[15] Interestingly if we look at all children in primary school age in these households, boys', girls' and total enrollment rates are higher for households with men as heads.

education is.[16] Therefore, schooling entails risk and it is worthwhile to investigate for the influences of risk preferences on school attendance.

The Ethiopian Rural Household Survey measures time preferences in the following way:

As a first step, the household head is asked whether he or she would prefer 100 Birr today or 125 Birr in one month. If he or she says that they would take the 100 Birr now, a second question is asked. This time the head is asked whether he or she prefers 100 Birr today or 150 Birr in one month. Finally, if the respondent declares that they would again choose the 100 Birr they are asked how much they would have to be given in order to wait for one month.

After that the same set of questions in the same order is asked again with the sole difference that the respondent now has to choose between receiving the money in one month or in two months.

The fact that the heads of households are being made to compare income now with income a month ahead as well as income one month ahead with income two months in the future is an advantage to the study of determinants of schooling as educations decisions might entail a similar choice. If a child gets the possibility to attend school not only present income is foregone, but also income many years ahead will be reduced due to the school attendance of the child. Besides, a child might not be very productive yet at a time when schooling decisions have to be already made for the first time. For the regressions, I simply take the amounts for which the heads are willing to give up present consumption (cleaned for outliers).

3.4.8 Risk Preferences of the Head of Household

Risk preferences are being tested with the help of a little economic experiment: A coin is flipped and will either land on lion or crown. Before, the respondent (who is again the head of the household) can choose one of five options: He can either choose to receive 2.5 Birr regardless of whether the coin lands on lion or on crown, to receive 2 Birr if the coin lands on lion and 4 if it lands on crown, 1.5 Birr if it lands on lion and 5.5 Birr if it lands on crown, 1 Birr if it lands on lion and 7 Birr if it lands on crown or 0 Birr if it lands on lion and 10 Birr if it lands on crown. Before the real round, a practice round is played. The values for the answers are simply the numbers from 1 to 5 starting with the most risk averse possibility.

[16] On the particularities of the risk of investment in education in developing countries such as child mortality see Estevan and Baland (2007).

After the experiment the head of household is asked a similar question regarding a fictional situation. They are supposed to imagine that they are going to the market with a bag of maize and can choose between five outcomes: Either they will definitely receive 250 Birr for the bag or have an equal chance to receive either 200 or 400 Birr, 150 or 550 Birr, 100 or 700 Birr or 0 or 1000 Birr. Again, the answer is supposed to be indicative of the individual's overall risk preferences. The values are again 1 to 5 for the answers starting with the most risk averse.

Table 11 compares the mean values of the amount household heads would have to be given in a month in order to sacrifice 100 € today and the amount they would have to be given in two months in order to forego 100 € in a month for households where the oldest child in primary schooling age is attending school and those where he or she is not. We can that see the households who send their oldest child in primary school age to school have to be compensated slightly more in order to forego present income while households where the child is not attending school have to be compensated more in two months for sacrificing consumption in one month. These results would indicate that households that value schooling are less sensitive about sacrificing consumption in the near future but very averse to refrain from present consumption. The results are again not significant though.

When we look at the data on risk preference that were collected by using the experiment in Table 17, heads of non-attending children show more risk appreciative behavior when the risk is not too high, while those of attending children are less risk averse when the risk involves an outcome with no gain at all too. Yet, one would not assume that the households that decide for school attendance are those that are either very risk averse or not risk averse at all. Regarding the hypothetical question no pattern is discernible (Table 18).

Table 17. *Risk Preferences - Experiment*

	Oldest Child in Primary School Age attending School		Oldest Child in Primary School Age not attending School		Total
Choice	Freq.	% of households that chose same	Freq.	% of households that chose same	Freq.
2.5 Birr if lion or crown	59	89.39	7	10.61	66
2 Birr if lion, 4 Birr if crown	99	89.19	12	10.81	111
1.5 Birr if lion, 5.5 Birr if crown	178	85.17	31	14.83	209
1 Birr if lion, 7 Birr if crown	123	84.83	22	15.17	145
0 Birr if lion, 10 Birr if crown	239	88.52	31	11.48	270
Total	698	87.14	103	12.86	801

Table 18. *Risk Preferences - Hypothetical Market Situation*

	Oldest Child in Primary School Age attending School		Oldest Child in Primary School Age not attending School		Total
Choice	Freq.	% of households where oldest child attends school	Freq.	% of households where oldest child does not attend school	Freq.
certainly receive 250 Birr	147	91.30	14	8.70	161
equal chance: 200 Birr or 400 Birr	99	84.62	18	15.38	117
equal chance: 150 Birr or 550 Birr	173	89.64	20	10.36	193
equal chance: 100 Birr or 700 Birr	97	81.51	22	18.49	119
equal chance: nothing or 1000 Birr	183	85.92	30	14.08	213
Total	699	87.05	104	12.95	803

3.4.9 Regions

At last, dummy variables for the 4 regions of which the observed 18 peasant associations (PAs) are a part of are included. The 2009 wave of the ERHS includes households from 18 peasant associations in four different regions, namely Tigray, Amhara, Oromia and the Southern Nations, Nationalities, and People's Region (SNNPR). Ethiopia as a whole has 11 different regions. Of course dummies for the peasant associations would be more informative and would more aptly account for differences in infrastructure, in particular for the distance to the next school. The 4 regions are with the exception of Tigray very large and diverse by contrast with total populations between 15 and 27 million people. However, using peasant associations as proxies would not allow for enough variation due to the small number of observations. There are very few observations where the first child under 16 does not attend school for some PAs (see Table 19) and this number even reduces to zero when information on certain other independent variables has to be taken into account. Thus, I choose dummy variables for the regions. Tigray, which has the highest enrollment rate as can be seen in Table 20, is taken as a reference group.

Table 19. *Peasant Associations*

Peasant Association	oldest child in primary school age attending school	oldest child in primary school age not attending school	Total
Haresaw	7	44	51
Geblen	1	33	34
Dinki	4	27	31
Yetmen	3	21	24
Shumsha	10	45	55
Sirbana Godeti	3	32	35
Adele Keke	8	35	43
Korodegaga	13	44	57
Trirufe Ketchema	4	58	62
Imdibir	0	26	26
Aze Deboa	2	37	39
Adado	15	51	66
Gara Godo	7	32	39
Doma	4	30	34
Debre Berhan Milki	3	22	25
Debre Berhan Kormarge	2	25	27
Debre Berhan Karafino	3	16	19
Debre Berhan Bokafia	1	14	15
Oda Dawata	1	39	40
Bako Tibe	5	34	39
Somodo	8	35	43
Total	104	700	804

Note: Debre Berhan in the Amhara region is split into four different areas.

Table 20. *Regions*

Region	oldest child in primary school age attending school		oldest child in primary school age not attending school		
	Freq.	% of households where oldest child attends school	Freq.	% of households where oldest child does not attend school	Total
Tigray	77	90.59	8	9.41	85
Amhara	170	86.73	26	13.27	196
Oromia	277	86.83	42	13.17	319
SNNPR	176	86.27	28	13.73	204
Total	700	87.06	104	12.94	804

4. Methodology

4.1 Analysis on the Individual Level

First, I investigate the factors that determine school attendance at the individual level. Since the dependent variable can only take on two values (1 = attendance and 0 = non-attendance) I estimate a linear probability model (LPM) and a probit model.[17] The linear probability model takes the following form:

$$P(Y = 1|X) = \beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k + \varepsilon$$

In this model the probability of the dependent variable Y being 1 is a linear function of the independent variables X. In my investigation the dependent variable is attendance of children in primary schooling age and the independent variables are age and gender of the child, their educational level achieved so far, their main occupation and the time they spend on different activities:

$$\begin{aligned} P(attendance = 1|X) = {} & \beta_0 + \beta_1\, age + ß_2 gender + \beta_3\, some\_prim + \beta_4\, prim\_cycle1 \\ & + \beta_5\, primary + \beta_6 lit\_prog + \beta_7 church\_mosque + \beta_8 farmer + \beta_9 housework \\ & + \beta_{10} herder + \beta_{11} other\_occ + \beta_{12} tasks\_time + \beta_{13} farm\_time \\ & + \beta_{14} workpay\_time + \beta_{15} study\_time + \varepsilon \end{aligned}$$

Age and gender (0=male, 1=female) are basic characteristics of every child that must not be omitted in an investigation of the reasons of school attendance.

The education level the child has attained thus far is included in the form of dummy variables due to sample size (see also Section 3). The reference category are children with no completed schooling. *Some_prim* stands for completion of one to three years of primary schooling, *prim_cycle1* for completion of the 1st cycle of primary school (4 years) or a higher number of grades, but not completion of primary school as a whole. *Primary* stands for completion of primary school (8 years) or a higher level of schooling. Other dummies stand for completion of a literacy program or church or mosque school as the highest schooling attained.

Education levels already attained might influence the enrollment decision in two ways: First, they are an indicator of success in school and might thus encourage to individuals to pursue more education. Secondly, a certain educational level might be rated as the optimal level that

[17] For shortcomings of the linear probability model see Greene 2000, p. 813.

maximizes the person's or the household's wealth. Therefore, attaining this level might increase dropping out of school.

Time spent on domestic tasks, farm work, paid work outside the household and on studying is given in hours. Time spent on the first three activities is used in the regression, because I assume that time spent on work activities affects school attendance negatively. Time spent on studying is included although it is of course rather time spent on studying in the past that influences attendance.[18]

Turning to the main occupation of the child, student is the main occupation most often reported and taken as a reference category to see how school attendance is affected if work is the main activity. Farming, doing housework and herding are the most popular occupations apart from being a student and are included as dummy variables. Other occupations are summarized in the dummy variable *other_occ*.

The main occupation reported and the time spent on the different activities are not to be understood in the way that the latter variable is just a more precise version of the former. The time spent on the different activities only includes time spent at home. Therefore, the household head could report being a student as a child's main activity, because the child spends more time in school than on work activities, even if the child spends less time on studying than on work. This is not the exception to the rule, as table 21 shows: Among children of primary schooling age whose main activity is being a student, a majority of 969 children are reported to spend a larger amount of time on domestic tasks than on studying, while only 726 spend a larger amount on studying and 288 spend an equal amount of time on the two activities. When it comes to farm work, 862 children with being a student as their main activity are reported to spend more time on farm work than on studying. This constitutes the majority, but 862 spend a higher amount of time on farm work and 255 spend an equal amount of time on the two activities. However, as both groups of variables (time spent on different activities and main occupation) indicate allocation of time, I use both.

[18] Previous waves of the ERHS date from 2004 or earlier. Therefore using data about time use in the past would mean using data at least 5 years older than the ones used here. A lot of children were not of schooling age yet at that time and also, it has to be considered that time use could vary substantially depending on what grade of school a child attends.

Table 21. *Time Use of 7-15 year olds*

Time Use	Main Occupation Student		Other Main Occupation		Total
	Freq.	% of children in same time use category	Freq.	% of children in same time use category	Freq.
More Time used for Domestic Tasks than for Studying	969	65.52	510	34.48	1479
More Time used for Studying than for Domestic Tasks	726	97.06	22	2.94	748
Equal Amount of Time used for Domestic Tasks and Studying	288	63.58	165	36.42	453
More Time used for Farmwork than for Studying	862	67.24	420	32.76	1282
More Time used for Studying than for Farmwork	866	97.63	21	2.37	887
Equal Amount of Time used for Farmwork and Studying	255	49.90	256	50.10	511

Yet, I also add a specification without the variable main occupation, because information on whether a child's main occupation is being a student or some sort of work might to some extent just be another way of saying if the child attends school or not and not indicate a reason for attendance or non-attendance. That this is not completely the case (i.e. that also a substantial amount of children that do not report student as their main activity attend school) can be seen in Table 7.

Of course, also the time spent on various activities does not only influence the schooling decision but the two decisions are probably made simultaneously to some extent. However, there is no instrumental variable on the individual level that is associated with changes in time allocation but not associated with school attendance. Clearer results will be found in the household level analysis, where variables such as assets and the number of family members of different age groups act as proxies for the necessity that labor force be used or, put in other terms, for the productivity of labor in the household. It is therefore worthwhile to compare the results on the individual and on the household level. Yet, also on the household level potential endogeneity has to be considered.

Because of the possible simultaneity of time use and school attendance decisions another specification only includes age, gender and educational level already achieved. A fourth specification only uses age and gender.

The probit model ensures that the estimated probabilities of the dependent variable being 1 are between 0 and 1. Therefore, the probability is not a linear function of the independent variables. Instead, Φ stands for the standard normal cumulative distribution function (Wooldridge 2004: 531):

$$P(Y = 1|X) = \Phi(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k) = \int_{-\infty}^{X'\beta} \phi(v)dv$$

The independent variables are again age and gender of the child, their educational level achieved so far, their main occupation and the time they spend on different activities:

$$\begin{aligned} P(attendance = 1|X) \; = \; & \Phi(\beta_0 + \beta_1 \, age + ß_2 gender + \; \beta_3 \, some\_prim \; + \; \beta_4 \, prim\_cycle1 \\ & + \; \beta_5 \, primary + \; \beta_6 lit\_prog + \beta_7 church\_mosque + \; \beta_8 farmer + \beta_9 housework \\ & + \; \beta_{10} herder + \; \beta_{11} other\_occ + \; \beta_{12} tasks\_time + \beta_{13} farm\_time \\ & + \beta_{14} workpay\_time + \beta_{15} study\_time) \end{aligned}$$

As with the LPM model, all four specifications are used.

In the next step I take the fact that children often live in the same household into consideration. I thus employ a linear probability model with household fixed effects ("within effects"). The fixed effects model captures household specific unobserved characteristics that are assumed to remain constant over time.

Unfortunately, using fixed effects in probit and logit models results in inconsistent estimates when the number of cross-section units is large, but the number of observations per household is small[19] (cf. Maddala 1987: 315 – 317 and Wooldridge 2001: 483 – 484).

The problem can be solved for the logit model since the logit functional form allows that conditional maximum likelihood methods be used, because the joint distribution of within-group values of the dependent variable conditional on the independent variable and the sum of within-group values of the dependent variable does not depend on the fixed effects. Yet, the same cannot be achieved for the probit model (Wooldridge 2001: 490 – 492).

I am thus given the alternative to either use a FE linear probability model or a FE logit model. Since the results without fixed effects were very similar for both estimations I report results from the linear model which takes the following form:

[19] The mean number of children in the primary school age range among households with children in this age range is 2.29 for the 2009 wave of the ERHS.

$$P(y_{ih} = 1|x_{1ih}, \dots, x_{kih}, u_h) = \beta_0 + \beta_1 x_{1ih} + \dots + \beta_k x_{kih} + u_h + \varepsilon_{ih}$$

The dependent variable y and the independent variables x_1 – x_k are now not only organized by observation (index i) but also by household (index h). All effects that are the same for the members of a household are captured by u and only affect the intercepts but not the slopes.

Again, the independent variables are age and gender of the child, their educational level achieved so far, their main occupation and the time they spend on different activities:

$$\begin{aligned} P(attendance_{ih} = 1|x_{1ih}, \dots, x_{kih}, u_h) = {} & \beta_0 + \beta_1\, age_{ih} + ß_2 gender_{ih} + \beta_3\, some\_prim_{ih} \\ & + \beta_4\, prim\_cycle1_{ih} + \beta_5\, primary_{ih} + \beta_6 lit\_prog_{ih} + \beta_7 church\_mosque_{ih} \\ & + \beta_8 farmer_{ih} + \beta_9 housework_{ih} + \beta_{10} herder_{ih} + \beta_{11} other\_occ_{ih} \\ & + \beta_{12} tasks\_time_{ih} + \beta_{13} farm\_time_{ih} + \beta_{14} workpay\_time_{ih} + \beta_{15} study\_time_{ih} \\ & + u_h + \varepsilon_{ih} \end{aligned}$$

Again, the model is applied to all four specifications.

4.2 Analysis on the Household Level

At the household level I use a probit model to estimate the effects on the attendance of the oldest child in the primary school age range. The independent variables are now food expenditure of the household per capita, land of the household in hectares, the number of small and large animals (as defined in chapter 3) owned by the household, the number of hoes and ploughs owned by the household, the number of children under 7 years old in the household, the number of young people between 7 and 19, the number of adults from 20 to 64, the number of older people over 64, education of mothers and fathers of the children, age and gender of the household head, time and risk preferences and regional dummies which gives the following specification (equation 13):

$$\begin{aligned} P(attendance = 1|X) = {} & \Phi(\beta_0 + \beta_1\, ln\_food\_allpc7 + ß_2 land\_ha + \beta_3\, small\_animals \\ & + \beta_4\, large\_animals + \beta_5\, hoes + \beta_6 ploughs + \beta_7 under7 + \beta_8 bw7and19 \\ & + \beta_9 bw20and64 + \beta_{10} over64 + \beta_{11} some\_edu\_m + \beta_{12} some\_edu\_f \\ & + \beta_{13} gender\_head + \beta_{14} age\_head + \beta_{15} time + \beta_{16} time2 + \beta_{17} coin\_real \\ & + \beta_{18} market + \beta_{19} region2 + \beta_{20} region3 + \beta_{21} region4) \end{aligned}$$

What is the aim of using this composition of independent variables? First, I want to capture the economic situations of households insofar as they influence schooling decisions, i.e. their budget, the productivity of their members and their demand for labor. Knowing this allows one to draw conclusions on how households would optimally allocate the time of their young members between work and schooling. Because functioning labor markets are absent, changes in labor productivity and demand become apparent only through the behavior of household members. Econometric analysis then shows if these inferences about optimal time use hold. Second, some of the variables do not measure the economic situation of the households in the narrow sense, but rather their preferences. Some variables fall into both categories.

Food consumption per capita is a proxy for income and thus an indicator of the budget situation of the household. One would assume that the higher the income or budget of the household, the higher the probability that children are attending school, because wealthier households can do without the labor force of their children more easily. Land of the household also contributes to the household's wealth but at the same time is an asset that requires labor. Its effect is thus unclear, especially if the food consumption proxy does not capture all income stemming from land use. The number of small animals should reduce the probability of attendance since they make the labor force of children more valuable, while the number of large animals could measure income. So could the number of ploughs, while the number of hoes again makes child work more valuable (as explained in chapter 3). The presence of very young children and very old people in the household would raise the demand for work within the household and should thus be particularly detrimental to the school attendance of girls, since they mostly work within the household while boys work rather on the farm. Other young people or adults in the household should rather work towards a rise in enrollment, because labor can be split among family members.

The education of mothers and fathers is expected to cover attitudes towards education in the household, but it should also be noted that parents that had education themselves are likely to be able to better assess the benefits, the costs and the risks of schooling. Drawing on the studies mentioned in chapter 1 that see a positive effect of schooling on personal income one would assume that better educated parents know more about the benefits of schooling and rather send their children to school than parents without or with less education. These variables could thus also be seen as not only measuring attitudes but also the prevalence of information for the economic decision of school enrollment of children.

I create dummy variables indicating if the mothers and fathers have completed at least one year of schooling or no completed schooling at all. The reason (as shown in chapter 3) is that most parents have either completed very little or no education at all.

The age of the household head could be indicative of economic decisions simply because an older head will not be able to enjoy the benefits of schooling of children for as long as a younger one. However, it should also cover differences in attitude towards schooling, because as already mentioned school attendance has risen substantially over time.

The effect of the gender of the household head is unclear. A female head could affect enrollment in a positive way in as far as they would be particularly concerned about schooling of girls, but at the same time, a female led household could have a greater need for labor force if the head is a widow.

Besides the purely economic variables and those that reflect in part the economic situation and in part the preferences of the household (education of parents, age and gender of the household head) time and risk preferences fall in the third group of variables indicating only preferences.

Time preferences appear in the form of two variables: *Time* is the amount of money the household would have to be paid in one month in order to give up 100 birr in the present while *time2* is the amount of money he or she would have to be paid in two months' time in order to give up 100 birr in one month. Therefore, *time* and *time2* measure the effect of a preference for present over future consumption on schooling decisions. A household head with a strong preference for present consumption might not value the benefits of schooling (which can usually be enjoyed only in the future) as high as a household who does not have such a strong preference for present consumption.

Risk preferences appear in the form of the variables *coin_real* and *market*, the first capturing the economic experiment that is supposed to reveal risk preferences, the second the hypothetical question about gains to be made on the market as explained in chapter 3. Values for both variables range from 1 to 5 and higher values indicate that the household head is more appreciative of risk, i.e. less risk averse. It is unclear whether a head of household that is more risk averse will not like to invest in children's education because that investment comes with a certain risk or if he or she will appreciate education of children because using children's productivity and therefore foregoing the future benefits of education is considered risky.

Regional dummies capture a whole variety of economic factors but should be treated with caution since regions are very large. As explained in chapter 3, village dummies would have been preferable but cannot be used because the number of observations is too low.

Because including the education of parents drastically reduces the number of observations from 520 to 280, one specification without these two variables is included (equation 14).[20]

Another specification is added that only uses independent variables that do not solely refer to preferences, i.e. all variables except *time*, *time2*, *coin_real* and *market* (equation 15). Also this specification is tried without the two variables pertaining to education of parents (equation 16). Yet another specification (equation 17) only considers the variables that definitely only capture the budget, the labor productivity and the demand for labor of households (with regional dummies added) and do not capture preferences.

[20] The household head is asked about who the biological parents of children aged 0-21 in the household are. In fact, mothers' ID exists for less than all children in this age group, fathers' ID for even fewer. Also by taking education of the household head instead of the parents the number of observations in the regressions does not increase substantially.

5. Results

5.1 Results on the Individual Level

Table 22 shows the coefficient estimates for the individual level analysis. The first column gives the results for the linear probability model, the second the ones for the probit and the third the ones for the linear probability model again, but this time with household fixed-effects. As explained in chapter 3, educational levels are only considered for primary education.

First, one can see that age has a negative effect on school enrollment, even though only primary school age children are considered. This effect becomes significant at a higher level when household fixed effects are accounted for. We already know that most households overall as well as most households who send any children to school send their oldest children in the age range to school as one of these children. However within a household and when other causes such as educational grade attained and hours spent on work are being accounted for it is rather the younger children that seem to be allowed to go to school. One potential explanation would be the hypothesis that older children help finance younger children's schooling with their work. Besides, their productivity is higher than that of younger children. Yet, these factors should be accounted for by the occupation and time use variables. Indeed, the effect of age becomes larger when we look at equations where occupation and time use variables are left out (equations 7 – 9). However, a negative coefficient for age not influenced by the necessity to spend time on work activities makes sense simply insofar as it can be assumed that the number of children dropping out of school is higher than the number getting newly enrolled for each age group except for young children who are of the age where enrollment usually starts (around 7 years old).

Gender does not seem to have any effect on attendance at all which is well in line with the descriptive fact that schooling rates are equally high for girls and boys.

The level of schooling already attained does not play a role on attendance unless the work situation of children is not included in the regression. An exception is the completion of the first cycle of primary school (usually at age 11) which enhances further schooling. Completion of the first cycle of primary school could be significant because it is a measure of academic success in the age group from 7 – 15 years. So is completion of primary school, but it means graduation form a whole school type per se and could thus more likely be the end of school attendance, and also takes place at the upper bound of the age group. Completion of primary school is – all variables included - only significant in the fixed effects

model. It could thus also represent a greater likelihood of oldest children within a family going to school. Yet, as the general age coefficient is negative in the FE model, this would then mean that older and younger children in a family have a larger enrollment rate than “middle children”, the older ones possibly because they are the first born, the younger ones maybe because the middle children finance their attendance with their work and because drop-out rates rise with age.

Participation in a literacy program is significant and positive as long as all occupational variables are taken into account. Once these variables are left out it becomes negative all of a sudden. It can be assumed that participation in a literacy program is particularly relevant to children (and people in general) who work a lot because literacy programs are not as time consuming as school attendance. These children can however not enter the regular education system because work does not leave them enough time. Among those that do not work however literacy programs might either be the first step towards regular schooling or they might be currently attending the program.

Next we look at primary occupations. The reference group for these dummy variables was “student”. All primary occupations have a strong and significant negative effect on school attendance as one would have thought.

If we look at the time spent on different activities, we find that they also have the a priori assumed effect on attendance. More time spent on studying is correlated with a higher probability for attendance, while time spent on farm work, domestic tasks and paid work lowers the probability of school attendance. As seen earlier, paid work outside the household is very uncommon however and labor markets in rural Ethiopia are non-functioning. It is therefore no surprise that the variable for paid work is insignificant for all three regressions when all other variables are included. As stated above already, it should however not be overlooked that occupation and time use are most likely not only influencing school attendance but also consequences of attendance or decided simultaneously with schooling decisions.

Leaving the information about work aside gender becomes significant. The fact that girls are more likely to go to school than boys, if workload is not considered in the equation reflects the fact already visible in Table 9 that time spent on domestic tasks which is performed mostly by girls interferes less with schooling than farm work which is done mostly by boys. This effect becomes even stronger when grades already completed are left out, indicating that girls are apparently the better students. However, there is no gender effect once household effects are taken into account.

Table 22. *Coefficient Estimates on the Individual Level*

VARIABLES	(1) LPM attendance	(2) Probit attendance	(3) LPM FE attendance	(4) LPM attendance	(5) Probit attendance	(6) LPM FE attendance
Age	-0.00372*	-0.0361	-0.00867***	-0.0234***	-0.118***	-0.0326***
	(0.00209)	(0.0302)	(0.00281)	(0.00312)	(0.0238)	(0.00390)
Gender	0.00512	0.120	-0.00817	0.00971	0.142	-0.0219
	(0.00964)	(0.147)	(0.0124)	(0.0146)	(0.117)	(0.0179)
some_prim	-0.000446	0.0222	0.0186	-0.00840	-0.0531	0.0478*
	(0.0142)	(0.178)	(0.0179)	(0.0216)	(0.148)	(0.0260)
prim_cycle1	0.0230	0.423*	0.0459**	0.0567**	0.376**	0.119***
	(0.0165)	(0.233)	(0.0228)	(0.0250)	(0.185)	(0.0329)
Primary	0.0300	0.948	0.0810**	0.0340	0.603	0.148***
	(0.0292)	(0.667)	(0.0386)	(0.0444)	(0.475)	(0.0559)
lit_prog	0.248***	1.106*	0.114	-0.255**	-0.549	-0.231
	(0.0748)	(0.623)	(0.0986)	(0.112)	(0.582)	(0.142)
church_mosque	0.0437	0.155	-0.0949	0.138	0.398	0.0825
	(0.0606)	(0.611)	(0.0785)	(0.0921)	(0.586)	(0.114)
Farmer	-0.767***	-2.479***	-0.770***			
	(0.0269)	(0.268)	(0.0388)			
Housework	-0.839***	-2.928***	-0.841***			
	(0.0219)	(0.249)	(0.0326)			
Herder	-0.745***	-2.272***	-0.732***			
	(0.0261)	(0.245)	(0.0387)			
other_occ	-0.822***	-2.685***	-0.738***			
	(0.0621)	(0.625)	(0.0827)			
tasks_time	-0.00124***	-0.0134**	-0.000336	-0.00482***	-0.0231***	-0.00400***
	(0.000393)	(0.00555)	(0.000629)	(0.000582)	(0.00426)	(0.000885)
farm_time	-0.00153***	-0.0139***	-0.00111**	-0.00544***	-0.0217***	-0.00495***
	(0.000343)	(0.00445)	(0.000528)	(0.000491)	(0.00341)	(0.000737)
workpay_time	-0.00112	-0.0124	0.00136	-0.0117***	-0.0392***	-0.00426
	(0.00135)	(0.0157)	(0.00218)	(0.00198)	(0.0110)	(0.00297)
study_time	0.00389***	0.0620***	0.00563***	0.0184***	0.158***	0.0227***
	(0.000647)	(0.0114)	(0.00114)	(0.000880)	(0.00999)	(0.00147)
Constant	0.999***	2.010***	1.008***	1.094***	2.090***	1.100***
	(0.0236)	(0.317)	(0.0286)	(0.0356)	(0.260)	(0.0411)
Observations	1,961	1,961	1,961	1,961	1,961	1,961
R-squared	0.690		0.683 (within)	0.283		0.327 (within)
F-stat/chi2	289.1	901.2	131.8	70.02	585.1	40.66
Number of Groups			1,029			1,029

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 22. *(continued)*

VARIABLES	(7) LPM attendance	(8) Probit attendance	(9) LPM FE attendance	(10) LPM attendance	(11) Probit attendance	(12) LPM FE attendance
age	-0.0263***	-0.131***	0.0294***	-0.0102***	-0.0553***	-0.00774***
	(0.00347)	(0.0187)	(0.00429)	(0.00276)	(0.0150)	(0.00292)
gender	0.0232*	0.130*	0.00199	0.0305**	0.167**	0.00369
	(0.0139)	(0.0771)	(0.0160)	(0.0134)	(0.0726)	(0.0152)
some_prim	0.0511**	0.265**	0.125***			
	(0.0246)	(0.125)	(0.0300)			
prim_cycle1	0.178***	0.927***	0.258***			
	(0.0281)	(0.149)	(0.0374)			
Primary	0.249***	1.431***	0.354***			
	(0.0497)	(0.347)	(0.0636)			
lit_prog	-0.319**	-0.915	-0.336**			
	(0.128)	(0.560)	(0.166)			
church_mosque	0.0756	0.466	0.0988			
	(0.106)	(0.606)	(0.133)			
Farmer						
Housework						
Herder						
other_occ						
tasks_time						
farm_time						
workpay_time						
study_time						
Constant	1.083***	2.221***	1.061***	0.993***	1.796***	0.977***
	(0.0397)	(0.215)	(0.0454)	(0.0333)	(0.184)	(0.0348)
Observations	1,981	1,981	1,981	2,159	2,159	2,159
R-squared	0.046		0.070	0.009		0.007
F-stat/chi2	13.67	85.92	9.984	9.676	19.44	3.535
Number of Groups			1,039			1,103

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Marginal effects for the probit model are evaluated at the sample mean. In the case of binary dummy variables effects of discrete changes from zero to one are reported.

Table 23. *Marginal Effects on the Individual Level*

VARIABLES	(2) attendance	(5) attendance	(8) attendance	(11) attendance
age	-0.00277	-0.00801***	-0.0230***	-0.0102***
	(0.00233)	(0.00187)	(0.00325)	(0.00275)
gender	0.00917	0.00962	0.0229*	0.0308**
	(0.0112)	(0.00793)	(0.0135)	(0.0133)
some_prim	0.00170	-0.00361	0.0468**	
	(0.0136)	(0.0101)	(0.0221)	
prim_cycle1	0.0296**	0.0235**	0.142***	
	(0.0150)	(0.0110)	(0.0201)	
primary	0.0337***	0.0244**	0.104***	
	(0.00850)	(0.0101)	(0.00818)	
lit_prog	0.0331***	-0.0613	-0.257	
	(0.00651)	(0.0957)	(0.209)	
church_mosque	0.0103	0.0187	0.0600	
	(0.0351)	(0.0179)	(0.0531)	
farmer	-0.694***			
	(0.0886)			
housework	-0.811***			
	(0.0602)			
herder	-0.622***			
	(0.0910)			
other_occ	-0.770***			
	(0.173)			
tasks_time	-0.00102**	-0.00158***		
	(0.000436)	(0.000344)		
farm_time	-0.00107***	-0.00148***		
	(0.000359)	(0.000299)		
workpay_time	-0.000948	-0.00267***		
	(0.00121)	(0.000819)		
study_time	0.00475***	0.0107***		
	(0.000848)	(0.00111)		
Observations	1,961	1,961	1,981	2,159

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.2 Results on the Household Level

At the household level the food consumption proxy for income is positive and significant for all specifications. As one would generally assume, children of wealthier households are – all other factors equal - more likely to attend school. Looking at the marginal effects I find a one percent increase in food consumption raises the likelihood of school attendance for a child by 0.0876/100 = 0.09%.[21] Interestingly, food consumption has the lowest significance level when all variables except the two that indicate education of parents are used (equation 14). However, these two variables do not seem to have a positive effect on enrollment themselves. Maybe households which report the education of parents of children living in the household report more accurate information overall though, which could explain the fall of the significance level of food consumption once these variables are not considered. Marginal effects are substantially lower in all specifications where the number of observations has risen due to exclusion of variables about parental education.

The effect of land holding is also significant and diminishes the likelihood of school attendance. This is also a result that is in line with the idea that owning land and certain other assets raises the productivity of the members of a household. Like the income proxy land holding has a lower significance level when parental education variables are excluded and the number of observations rises.

Highly and robustly significant for all specifications is the coefficient for large animals. Based on its effect on the productivity of children's work, large animals should not have any impact on school enrollment at all, because as opposed to small animals they cannot be tended by children. However large animals could also act as a wealth or an income proxy that captures aspects of income different from those that appear in food consumption. This could then ultimately lead to the existing positive effect.

Surprisingly, the coefficient for ownership of small animals is far from any reasonable significance level at all. One would assume that ownership of small animals makes child work more productive and therefore has an adverse effect on school attendance, but this does not seem to hold true at all. The time use statistics used in the individual level analysis cannot help to explain this because information is not disaggregated to the level where one could distinguish between agricultural and herding activities. Yet, the main occupation variable reveals that herding activities are as widespread as farming activities among children (Table 6). It should be added that the previous work that is based on ERHS data from 1994 and 1995 also paints an ambiguous picture on this question: While Weir (2010)

[21] This is for the average individual (cf. Baum 2006: 251).

reports highly significant marginal effects for boys (which makes sense considering that girls are mainly engaged in intra-household work)[22] Cockburn and Dostie (2007) do not find significant effects.

Effects of the ownership of hoes and ploughs are clearly insignificant as well. The coefficients do however have the direction that one would assume considering the effect of these assets on the labor productivity of children: Ploughs can only be used by adults and thus act solely as a wealth proxy and increase schooling. Hoes on the contrary can be used by children and thus should have a decreasing effect on school enrollment.) As was the case for other variables, significance levels of the ploughs coefficient improve in specifications where parental education is used.[23]

Surprisingly, the composition of the household does not play any significant role at all. One would expect especially the number of under 7 and over 64 year olds to have a negative effect on schooling probability because in these households children might often have to look after the very young or old household members. Yet, the results are partly in line with Weir's (2010) findings for 1994 and 1995 where only the marginal effects for the number of adults between 19 and 64 is significant while the effects for young children and elders in the household are not significant.

While mothers' education does not seem to have an effect on attendance, fathers who have at least completed one grade of schooling themselves seem to be less likely to send their children to school. This result comes somewhat unexpectedly, a potential explanation could be found when the fact that most parents have completed only few grades of school is taken into consideration: Fathers could think of their own level of schooling as being optimal and thus not allow their children to go to school after having attained that same level. Previous studies also do not show a clear direction of results: Cockburn and Dostie (2010) who choose education of the head as the relevant variable find mostly significant results, while Weir (2010) does not find significant results for years of education of mothers and fathers.[24]

Gender and age of household head do not turn out to be significant. Yet, it should be added that the age of the household head is almost significant at the 10% level in those specifications where parental education is included. Also, it is only in these specifications that the effect is negative, which speaks again for the quality of the sample reduced due to use of parental education variables. This result is in line with the idea that older household heads are either less positively minded towards the benefits of schooling per se or value the

[22] Weir does not report coefficients but marginal effects only which makes comparison more difficult.
[23] They do however remain far from any reasonable significance level. (The p-values are about 0.15 and 0.20.)
[24] Yet, Weir's data also allow for the isolation of parents' cognitive skill scores.

economic returns for the household less highly because of their age. Results of the comparable studies again do not show a clear picture: Weir (2010) finds highly significant marginal effects for the gender of the household head while Cockburn and Dostie's (2007) results are mostly insignificant.

Time preference effects are not only extremely small but completely insignificant. So is the experiment with the intention to reveal the risk preferences of the heads of households. As has been the case with some other variables, the hypothetical question about risk preferences (returns on the market) is only significant when the number of observations is reduced due to the inclusion of parental education variables. Yet its effect is negative, indicating that a preference for risk on the side of the household head would lead to a decrease in the probability of school attendance. However, as the returns to schooling are uncertain, it seems natural to assume that a more appreciative attitude towards risk should be linked with a greater likelihood of school attendance. Of course one could as already mentioned also argue that not to receive any schooling, at least up to a certain education level, would constitute a certain risk in itself. An explanation that uses both of the above aspects would be that a modest amount of preference for risk raises attendance probability while a very strong preference for risk would lead to a decline of attendance probability again. Regional dummies do not exert a significant influence.

Table 24. *Coefficient Estimates on the Household Level*

VARIABLES	(13) attendance	(14) attendance	(15) attendance	(16) attendance	(17) attendance
ln_food_allpc7	0.528***	0.233*	0.570***	0.240**	0.246**
	(0.196)	(0.121)	(0.193)	(0.120)	(0.120)
land_ha	-0.307**	-0.131*	-0.359***	-0.148*	-0.147*
	(0.130)	(0.0777)	(0.125)	(0.0757)	(0.0754)
small_animals	0.00348	0.00206	0.00965	0.00462	0.00404
	(0.0167)	(0.0119)	(0.0161)	(0.0117)	(0.0117)
large_animals	0.264***	0.142***	0.261***	0.143***	0.146***
	(0.0922)	(0.0543)	(0.0903)	(0.0540)	(0.0539)
hoes	-0.0252	-0.0204	-0.0173	-0.0191	-0.0180
	(0.0658)	(0.0440)	(0.0637)	(0.0438)	(0.0432)
ploughs	0.0481	0.00874	0.0415	0.00819	0.00652
	(0.0334)	(0.0204)	(0.0322)	(0.0203)	(0.0201)
under7	0.0415	0.0911	0.0345	0.0766	0.0720
	(0.115)	(0.0755)	(0.112)	(0.0738)	(0.0713)
bw7and19	0.0655	-0.00658	0.0617	-0.00194	-0.00230
	(0.0823)	(0.0543)	(0.0799)	(0.0538)	(0.0536)
bw20and64	0.00695	0.0248	-0.0206	0.0160	0.0226
	(0.145)	(0.0767)	(0.137)	(0.0759)	(0.0739)
over64	0.286	-0.0756	0.235	-0.0827	-0.0123
	(0.348)	(0.184)	(0.336)	(0.183)	(0.146)
some_edu_m	-1.281**		-1.253**		
	(0.562)		(0.551)		
some_edu_f	0.607		0.575		
	(0.523)		(0.512)		
gender_head	0.0253	0.00647	-0.0839	0.00848	
	(0.801)	(0.175)	(0.772)	(0.175)	
age_head	-0.0177	0.00431	-0.0160	0.00416	
	(0.0113)	(0.00653)	(0.0112)	(0.00650)	
time	0.000379	0.000388			
	(0.000700)	(0.000513)			
time2	-0.000676	-0.000361			
	(0.000568)	(0.000400)			
coin_real	0.0377	0.0402			
	(0.0808)	(0.0543)			
market	-0.125*	-0.0463			
	(0.0746)	(0.0495)			
region2	-0.735	-0.391	-0.583	-0.394	-0.408
	(0.526)	(0.266)	(0.511)	(0.265)	(0.262)
region3	-0.151	-0.403	-0.0473	-0.396	-0.409
	(0.488)	(0.278)	(0.482)	(0.277)	(0.277)
region4	0.164	-0.170	0.200	-0.182	-0.201
	(0.486)	(0.265)	(0.477)	(0.262)	(0.254)
Constant	-0.128	-0.198	-0.782	-0.231	-0.0603
	(1.350)	(0.766)	(1.253)	(0.718)	(0.628)
Observations	280	520	281	522	526
Chi2	37.60	21.67	35.57	20.04	19.83

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 25. *Marginal Effects on the Household Level*

VARIABLES	(13) attendance	(14) attendance	(15) attendance	(16) attendance	(17) attendance
ln_food_allpc7	0.0876***	0.0489*	0.0992***	0.0510**	0.0521**
	(0.0322)	(0.0254)	(0.0331)	(0.0254)	(0.0252)
land_ha	-0.0509**	-0.0274*	-0.0625***	-0.0315**	-0.0310*
	(0.0212)	(0.0162)	(0.0214)	(0.0160)	(0.0158)
small_animals	0.000578	0.000432	0.00168	0.000981	0.000853
	(0.00277)	(0.00249)	(0.00281)	(0.00248)	(0.00246)
large_animals	0.0438***	0.0298***	0.0455***	0.0303***	0.0309***
	(0.0140)	(0.0111)	(0.0144)	(0.0112)	(0.0111)
hoes	-0.00418	-0.00429	-0.00301	-0.00405	-0.00381
	(0.0109)	(0.00924)	(0.0111)	(0.00930)	(0.00913)
ploughs	0.00798	0.00183	0.00722	0.00174	0.00138
	(0.00553)	(0.00428)	(0.00561)	(0.00431)	(0.00424)
under7	0.00687	0.0191	0.00601	0.0163	0.0152
	(0.0191)	(0.0158)	(0.0196)	(0.0156)	(0.0150)
bw7and19	0.0109	-0.00138	0.0107	-0.000412	-0.000486
	(0.0136)	(0.0114)	(0.0139)	(0.0114)	(0.0113)
bw20and64	0.00115	0.00521	-0.00359	0.00340	0.00478
	(0.0240)	(0.0161)	(0.0238)	(0.0161)	(0.0156)
over64	0.0475	-0.0159	0.0409	-0.0176	-0.00260
	(0.0574)	(0.0387)	(0.0583)	(0.0389)	(0.0309)
some_edu_m	-0.155***		-0.160***		
	(0.0540)		(0.0558)		
some_edu_f	0.118		0.116		
	(0.117)		(0.118)		
gender_head	0.00413	0.00136	-0.0154	0.00180	
	(0.129)	(0.0367)	(0.148)	(0.0370)	
age_head	-0.00294	0.000904	-0.00279	0.000883	
	(0.00188)	(0.00137)	(0.00195)	(0.00138)	
time	6.29e-05	8.15e-05			
	(0.000117)	(0.000108)			
time2	-0.000112	-7.59e-05			
	(9.50e-05)	(8.38e-05)			
coin_real	0.00624	0.00844			
	(0.0134)	(0.0114)			
market	-0.0207*	-0.00971			
	(0.0122)	(0.0104)			
region2	-0.165	-0.0908	-0.128	-0.0925	-0.0956
	(0.147)	(0.0673)	(0.136)	(0.0676)	(0.0669)
region3	-0.0259	-0.0940	-0.00833	-0.0933	-0.0962
	(0.0873)	(0.0711)	(0.0859)	(0.0716)	(0.0715)
region4	0.0267	-0.0368	0.0341	-0.0400	-0.0442
	(0.0778)	(0.0594)	(0.0797)	(0.0597)	(0.0578)
Observations	280	520	281	522	526

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6. Conclusion

Education is generally seen as an important factor contributing towards the well-being of humans. It not only makes people more productive and thus has a positive effect on their incomes but is also conducive to their overall well-being including physical and mental health and maybe even affects the political system of a country at large. Although Sub-Saharan Africa still has the lowest enrollment rates worldwide, net enrollment rates in Ethiopia have recently increased, most likely at least in part to the new education policy the government has adopted in 1994.

The current study identifies the determinants of school attendance of children in primary school age in rural Ethiopia and thereby considers factors such as age and gender of the children, their educational level at the time and the work activities they are engaged in as well as several factors pertaining to the household as a whole, such as income, existence of assets that would potentially make child work more productive, household composition, education of parents and age, gender and risk and time preferences of the household head.

Potential determinants at the individual level behave mostly as expected: Children who have been more successful in their educational achievements so far are more likely to attend school as are children who can spend more time on studying and less time on work activities and whose declared main activity is being a student. It should be considered however that occupation and time use decisions could suffer from endogeneity problems.

At the household level income (proxied by per capita food consumption) exerts a strong influence towards an increase of attendance probability, while ownership of land leads to a decrease, probably because it makes the labor force of children more productive. Other assets that were assumed to affect the productivity of children show no effect, as does the household composition. While one would assume that especially a large number of very young or old family members makes the labor force of children more valuable, this cannot be confirmed in the study. The education of fathers appears to decrease enrollment probability, which is unusual and has most likely to do with the fact that variation in the educational level of fathers is very little and that inclusion of parental education substantially decreases the number of observations. Time and risk preferences of the heads of households do not seem to exert an influence overall.

In summary, it can be stated that economic factors seem to be of a much greater importance than preferences and attitudes. First, as the individual level analysis reveals, schooling and work decisions are heavily intertwined, even if causality is hard to establish. Second, at the household level, the important factors are food consumption, which acts as a proxy for

income, and ownership of land which makes children's work more productive. Interestingly though other factors besides land that should affect children's productivity do not seem to play a role.

Having these results in mind one can agree with Cockburn and Dostie (2007: 560) who consider that in the course of asset-based poverty alleviation policies one should keep in mind not to encourage a decrease in school attendance. Yet, the prevailing study could only assert this potential danger for land and not for other assets such as animals or tools.

Future studies on the subject could benefit from the inclusion of characteristics related to village infrastructure and school infrastructure and the quality and cost of schooling. With the help of some of these variables the potential endogeneity of work and school decisions could also be better addressed. Household infrastructure characteristics could serve as a proxy for long-term wealth and thus evade the potential endogeneity of income. Although the 2009 wave of the ERHS is without a doubt a very ambitious and detailed collection of data pertaining to many different aspects of the lives of rural Ethiopians, more disaggregated information would be of interest, particularly when it comes to preferences and attitudes where only the head of household is considered for most questions at present.

Of course, it is without doubt that measuring wealth and the potential economic benefits of schooling remains particularly challenging in an environment where no functioning labor markets exist and where subsistence agriculture is widespread. Positive effects of schooling will often result in better harvests but not necessarily higher income.

7. References

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Summary:

Using the 2009 Ethiopian Rural Household Survey this study investigates the determinants of school attendance among children of primary school age (7-15 years) in rural Ethiopia. The investigation is separated into an analysis of factors operating on the individual level such as the age and gender of children or the allocation of their time to various activities and factors operating on the household level such as wealth, assets, household composition and characteristics of the parents of the children or the head of the household. Probit Models are used both on the individual and on the household level, yet on the individual level a Linear Probability Model with and without household fixed effects is also employed. On the individual level, above all a strong negative effect of age and time allocated to work on school attendance activities is found. On the household level, the wealth of the household has a positive effect while ownership of land affects school attendance negatively. The latter effect is most likely due to the fact that labor markets are largely absent and the work of children becomes more productive at the same time when the household owns land. Other factors that would have been expected to raise children's productivity and thereby decrease school attendance rates, such as the keeping of small animals or the household composition show no effect however. The risk and time preferences of the heads of households also do not seem to play a role.

Zusammenfassung:

Die vorliegende Studie verwendet den *Ethiopian Rural Household Survey* aus dem Jahr 2009, um die Faktoren, die den Schulbesuch von Kindern im Grundschulalter (7-15 Jahre) im ländlichen Äthiopien beeinflussen, zu untersuchen. Die Analyse wird dabei aufgeteilt in einen Bereich, der relevante Faktoren auf individueller Ebene wie zum Beispiel Alter und Geschlecht der Kinder sowie die Verwendung ihrer Zeit für verschiedene Aktivitäten untersucht, sowie einen Bereich, der Faktoren auf Haushaltsebene wie zum Beispiel Vermögen, Besitz von verschiedenen Gegenständen, Zusammensetzung des Haushalts sowie bestimmte Eigenschaften der Eltern sowie des Haushaltsvorstands behandelt. Für beide Analysebereiche werden Probit Modelle verwendet, für die individuelle Ebene kommt zusätzlich ein Linear Probability Model sowohl mit als auch ohne Fixed Effects für denselben Haushalt zum Einsatz. Auf der individuellen Ebene wird ein starker negativer Effekt des Alters sowie der Zeit, die für Arbeitstätigkeiten verwendet wird, auf den Schulbesuch gefunden. Auf der Haushaltsebene hat das Vermögen des Haushalts einen positiven Einfluss auf den Schulbesuch, während sich Landbesitz negativ auswirkt, was höchstwahrscheinlich darin begründet ist, dass es keinen funktionierenden Arbeitsmarkt gibt

und gleichzeitig die Arbeitskraft der im Haushalt lebenden Kinder produktiver verwendet werden kann, wenn der Haushalt Land besitzt. Andere Faktoren, wie das Haltern von kleinen Tieren und die Zusammensetzung des Haushalts, von denen ebenfalls angenommen werden konnte, dass sie die Produktivität der im Haushalt lebenden Kinder erhöhen und dadurch auf den Schulbesuch negativ einwirken, zeigen keinen Effekt. Die Zeit- und Risikopräferenzen der Haushaltsvorstände scheinen ebenfalls keine Rolle zu spielen.

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